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THE

DENTAL COSMOS:

A

MONTHLY RECORD OF DENTAL SCIENCE.

Devoted to the Interests of the Profession.

EDITED BY

EDWARD C. KIRK, D.D.S.

Observe, Compare, Reflect, Record.

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THE
DENTAL COSMOS.

VOL. XXXVI. PHILADELPHIA, JANUARY, 1894. No. 1.

ORIGINAL COMMUNICATIONS.

AMELIFICATION AND EPITHELIAL DEVELOPMENT.

BY HENRY BURCHARD, M.D., D.D.S., PHILADELPHIA, PA.

THE title of this paper is perhaps suggestive of a reopening of what is regarded as a long-settled dispute. Unfortunately, there are malcontents who feel to-day as much justice in their original positions as though a controversy had never arisen. No balance has been struck which is satisfactory to both factions.

Growing refinement in the methods of microscopical demonstration warrants histologists to-day in making statements rather positive which ten years ago were decidedly obscure. While one is appreciative of the immense value of individual labors in this direction, he cannot but see the indefiniteness of general results,—as much disagreement among embryologists as between them and certain other anatomists. Until there has been some generalization of the different observations, it can scarcely be hoped any positive teaching is justified.

Analogies are a fruitful source in the elucidation of scientific problems ; many questions may thus be made clear which without that aid would remain vague. The difficulty of such a course is the general charge of inaccuracy which assails any one who takes the initiative in treating scientific matters from a philosophical standpoint. It is, of course, impossible to deny that generalizations frequently do ignore isolated phenomena. This should not blind us to the inestimable service which has been and is derivative through such means. An individual may be unqualifiedly condemned for statements which demonstrate intellectuality of a higher order than the objectors can, not may claim. The present essay is not designed to defend, or attempt any defence, of a faction. Neither needs any.

Whatever histological statements are made are merely the A B C of the subject. The cuts of the paper, it is hoped, will be found sufficiently clear to convey the idea to be floated. As a preliminary, we must recognize distinctions among the sciences. Those which concern matters having purely a human origin may have departures from a standard occur in them, without invalidating the force of such rules as may be determined for erection into a system.

Note this, in such a science as philology ; exceptions to recognized rules may be admitted without weakening materially the force of that rule.

The physical sciences, on the contrary, must have the observed governing forces and phenomena so generalized that we have a continuous chain ; this is to be denominated a principle, a law. The greater the number of factors bound together in a whole, the more stability has the principle. Take any set of these observations generalized, and scientists are justified in reasoning from them by analogy.

Such a combination has been formed in what we may term the "rule of epithelial development."

Embryologists, anatomists, microtomists, from the time of Goodsir, have recognized the enamel of the teeth to be an expression of epithelial development. Admitting this, why should it not follow the general rule of the construction of tissue derived from such source? Deductive reasoning from this has been the *casus belli* between the analogists and present-day histologists.

The latter class, it appears, recognize an anomaly in this particular process. Admit the anomaly, and a law becomes invalid.

Induction undoubtedly led to the recognition of a rule of development. Too much deduction has been the cause of mischief, probably.

To the histologist, one may address the query, Have you an anomaly or have you misread the evidence?

To the analogist, Have you followed the steps of induction pursued by the microscopist?

One set of results has been the fruit of rather abstract reasoning ; the other, the direct product of individual observation.

It may be well here to recall the sense of a saying of Ruskin, "Ten men look for one who sees, ten see for one who thinks."

That a man is to believe what he sees, is granted. But seeing, as we know, is a variable term. To one individual this may be merely an irritation of his layer of rods and cones, the force expending itself upon that layer, and going no farther. His neighbor has the primary force correlated into currents of thought, which result in the arrangement of abstract formulations.

The common seeing of the histologists demonstrates to them an apparent anomalous formation. The analogist says such a reading will destroy an existing harmony, formed upon a broad basis,—a course always to be well weighed.

The questions are, Which of these opinions is correct? or, Are they both wrong? or, How much truth is in both?

One or the other class is undoubtedly misled.

There must be a cause for such difference of opinion.

Determining the cause should end the dispute.

Extreme views upon any subject are rarely correct. All controversy ends eventually on a common ground, a mean between contending factions.

It is idle, useless, to question the accuracy of the observations of those who have demonstrated the oldest layer of enamel to be formed in contact with the dentine or a sub-enamel membrane. Apropos of this, if such a membrane exist, and apparently it does, it can be nothing but the basement-membrane of the involuted mucous membrane. A glance at a good specimen will show plainly a line of demarkation between the peripheral cells of the dental pulp and the columnar cells of the inner boundary of the enamel-organ. As these latter cells recede, the boundary line remains.

Sudduth has demonstrated beyond a doubt its non-existence at early periods of development. This layer of cells (the ameloblasts), it is almost useless to state to-day, is always upon the formed enamel farthest from the dentine, and is persistent till the completion of amelification. That much is incontrovertible. On the other hand, we must recognize the force of the dictum of the anatomical analogist. With full appreciation of how much weight can and should be attached to this, all observers are compelled to deny the "exact" similarity between amelification and ordinary epithelial elaboration. Beyond a question, there are differences in the two processes. That biological processes are in accordance with law must be admitted. This with the recognition of the truth of the work of histologists in what they have done.

The embryologist, the anatomist, gives the rules—at least implies a formula—for the development of epithelial tissue. What this is, of course we know; that is, we are familiar with the idea represented; perhaps it has not been formulated.

The following is here offered as a suggestion, in the hope that contention may find content therein.

"*Epithelial tissues are formed with the oldest layers farthest removed from the source of nutrition.*"

Too much emphasis cannot be placed upon the fact that the writer is attempting no new demonstration. It is merely an effort to make a seeming divergence to read in conformity with a good generalization. The hope is that the definition may be found to hold, and include an odd process.

For the nourishment of any tissue we must have sufficient food-supply. For the growth and elaboration of so highly organized a tissue as dental enamel, the blood-current must be generous.

Fig. 1 represents a section from a developing cuspid, human fœtus about seven and a half months. This is from a photomicrograph which shows the relations of the various parts of a developing tooth-crown,—the lessening of the volume of the stellate reticulum at the apex; the external coat; the arrangement of odontoblasts and ameloblasts, and the formed enamel and dentine between them.

Fig. 2 shows the space between *a* and *b* of Fig. 1 magnified. *a*, the tissue of pulp; *b*, odontoblast; *c*, enamel. Between *a* and *b* a distinct line representing the sub-enamel membrane; between *c* and *d* (the stellate reticulum) the columnar cells, the ameloblasts, resting upon formed enamel. *e*, outer layer of epithelial cells; *f*, fibrous coat containing numerous injected blood-vessels.

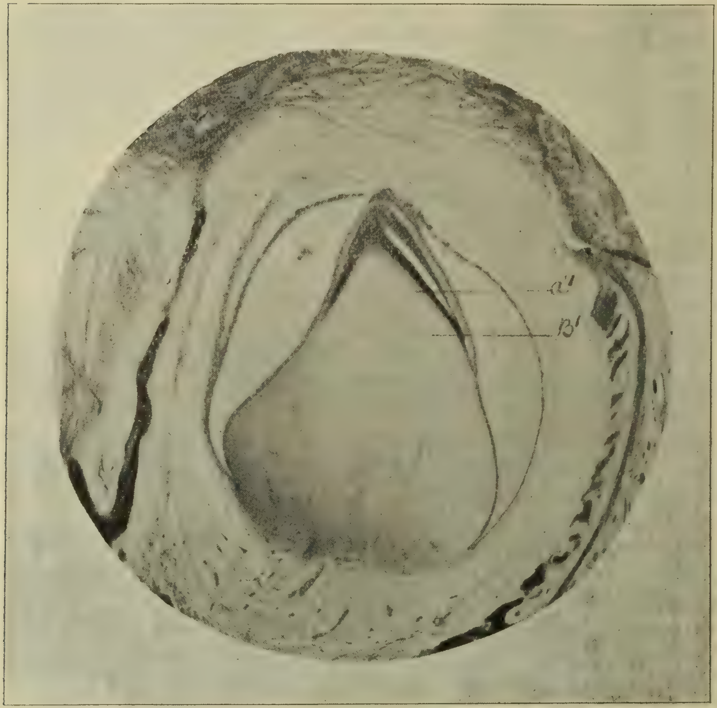
The external covering of the enamel-organ, shown in section here, will be found to be next a fibrous tissue. Ramifying through it are numerous injected blood-vessels It will be seen that they are more plentiful in this layer next the outer epithelial coat of the stellate reticulum than in the connective tissue away from it, demonstrating clearly their office to be the nourishment of some immediately adjacent tissue or organ.

The only one calling for such supply is evidently the enamel-organ.

Note that this is next a layer of infant cells. Lining cells of epithelium are functionating bodies.

Bounding the inner wall of the enamel-organ another layer of germinal cells, becoming columnar. This, it is seen, does not until its function ceases lose its identity as a "germinal layer," receding as the enamel is formed. With its progress proceeds the disappearance of the stellate reticulum, until at the completion of amelification the epithelial layers are in contact.

FIG. 1.



This process can be read to accord with our formula that epithelial tissues are formed with the oldest layers farthest removed from the source of nutrition, the source being recognized as the contents of the spaces of the stellate reticulum.

With the recession of the ameloblast is the disappearance of the stellate reticulum at that point. As a food-supply it has served its office, is exhausted.

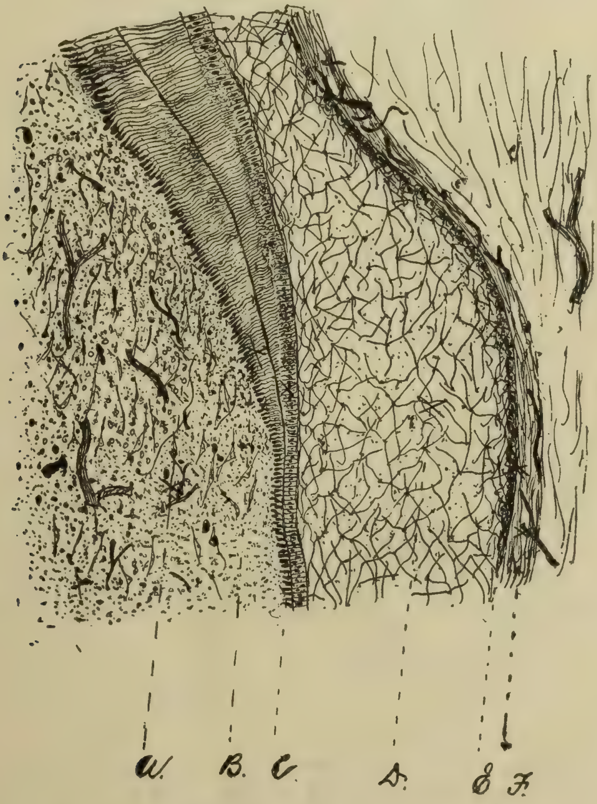
The outer layer of infant cells must subserve some important purpose, or they would not persist in that form. This purpose, apparently, can be nothing but the modification of the serum in its passage from the blood-vessels next them to the spaces of the stellate reticulum on the inner side. That is to say, the chemical composition of the fluid contents of the stellate reticulum will be found different from that of the fluids on the other side of this epithelial layer.

The epithelium here acting as the lining membrane of a temporary gland, its secretion the contents of the spaces of the stellate reticulum.

The analogy is not far-fetched. We have the typical blood-supply, a functionating layer of epithelium, the secretion, the fluid of the stellate reticulum.

This secretion forms the food-supply for the layer of ameloblasts, an infant layer of epithelium which has its source of pabulum in contact with it until it ceases functionating. The embryonic layer pushes from, or is pushed from, the older portion,—the formed material next them, the storehouse of pabulum being farthest from the oldest portions. Substantially the same process as ordinary epithelial elaboration,—a single layer of germinal cells, the source of formed products. The original involution modifying the appearance of what would otherwise be a close analogy,—as close as the formation of hair, nails, and horns, certainly. Dr. Andrews has, in Proceedings of Medical Congress, Berlin, contributed very valuable observations upon this formation. The pages of the DENTAL COSMOS during the past ten or fifteen years have made us familiar with the results of the labors of Andrews, Sudduth, Black, and Williams. We can scarcely question

FIG. 2.



the extreme accuracy of their observations, nor be wanting in admiration of their "microscopic technique." With this, however, there are still questions to be determined. If enamel be a secretion excreted by a cell, the excreted body must be fluid. Homogeneous fluids flow together. Subsequent hardening of this could not, unless the process be one purely of crystallization, have any lines of demarkation between the individual elements.

In the enamel boundaries *do* exist, and mark the individual elements as prisms,—a form which could only be acquired by a molding in a matrix for each one.

The query here is, Whence comes the two per cent. of organic matter in the enamel? Grant that the enamel is formed *in* the terminal portions of the hexagonal prisms, and it is explained. It becomes clear, also, why enamel is prismatic, why it is wavy, and the why of its peculiar radiation. Assume that it is the product of an excretion, and why should it have any definite form, and why should it contain any organic matter at all?

This of course recognizes the fact of the peculiar composition of the mineral matter forming the enamel,—that it is a globulus; but, even then, if excreted from a cell, why should it not form a body without distinct individual elements?

Since writing this, there has appeared an article in the November Cosmos by Carl Röse, M.D., of Freiburg. A reference to the unequaled, beautiful drawings illustrating that paper will make clear some of the present writer's reasons for such statements as are found here.

OBSERVATIONS AT THE LATE CONGRESS ON IMMEDIATE REPLACEMENT OF TISSUES. (1) THE FACE, NOSE, TONGUE, AND JAWS, AS PRACTICED BY DR. CLAUDE MARTIN, OF LYONS, FRANCE; AND (2) THE TARDY REPLACEMENT OF TEETH, AS PRACTICED BY DR. WM. J. YOUNGER, OF SAN FRANCISCO, CAL. WITH PERSONAL OBSERVATIONS ON TARDY AND IMMEDIATE REPLACEMENT OF NATURAL TEETH.

BY LOUIS OTTOFY, D.D.S., CHICAGO, ILL.

(Read before the New England Dental Society, at Worcester, Mass., Oct. 5, 1893.)

MR. PRESIDENT AND GENTLEMEN:

I am before you to-day to present in a great measure the work of a man who has devoted over fifteen years to the development of means for the restoration of the beauty of the human face where accidents or disease would make the most beloved friend sometimes an object of pity, and often only a loathsome, repulsive monstrosity.

When I first promised to read this paper, I had some hopes of securing some of the specimens of "immediate prosthesis" of Dr. Martin on exhibit in the Anthropological Building at the World's Fair in Chicago. The red tape that binds a foreign exhibit when it is once within the limits of Jackson Park seems to have no beginning, and certainly no end, and my efforts were without success. I have, however, been so fortunate as to receive a few specimens from M. Chas. Godon, of Paris, France, who came as one of the representatives of the French government to the late congress, and there intended to present at length the work of his friend, Dr. Claude Martin, but the time was too short to attempt securing the specimens from the exposition, and, as my later experience demonstrated, it would have proven futile.

While I am willing to give the full measure of credit to the development of dental prosthesis in the United States, I must admit that in this line of work Americans are so far behind as not even to have commenced. The reading of this paper, by one whose acquaintance with the subject is only theoretical, has as its main purpose to interest some one to take up this line of work and introduce it, and to bring it up to the perfection developed by Dr. Martin, and, if possible, to improve upon it. While it is true that Dr. Martin has spent fifteen years in this line of work, it must be remembered that all his cases were described in a foreign language, and many of them published in medical instead of dental journals. The modesty of the man has prevented him from pushing to the front. In 1889, however, Dr. Martin published a work on the entire subject, to which he has just added a small volume on his observations to date, as relating to the inferior maxilla.

In view of the fact, which I am free to admit, that during the sixteen years of my professional life I have never seen so complete an exhibit in any one line of dental art, it would seem preposterous to suppose that I could describe it all in a paper to be read before a society. I have carefully looked over the entire collection of models, casts, and pieces, and will describe here only typical cases. Dr. Martin's work consists in replacing any part of the face from forehead to neck, and from the root of the nose to the pharynx, after any or all of these parts have been removed by the surgeon's knife, as a result of accident or disease. In those instances wherein delay would result in disfigurement or further injury, the parts are replaced immediately, and these are designated as cases of immediate prosthesis.

In a case for replacement of a lower jaw, he proceeds as follows: It being, as a rule. impossible to determine before an operation the full extent of it, the quantity to be removed being governed and determined by the conditions to be met as the surgeon proceeds, Dr. Martin makes an entire lower maxilla of hard rubber, approximating the size to that of the individual about to be operated on. This is made upon models secured from a collection of lower maxillæ. Immediately after the surgeon has removed the diseased or injured portion, the dentist cuts a corresponding piece from the vulcanized maxilla, attaches gold stays thereto, and introduces it between the remaining fragments, thus holding them in position until the parts have healed, enabling the patient in the meanwhile to retain the saliva in the mouth, and, by preventing the displacement of the remaining fragments, the tongue is not crowded from the floor of the mouth, hence permitting distinctness of speech. This first piece is intended for temporary use only, and carries no teeth. It is worn for from two to four months, and is then replaced by a permanent piece, in which the teeth, mounted in pink rubber, are carried. The specimen of this kind of replacement which I have here is one made by M. Chas. Godon, of Paris, and is described by him as follows:

"M. B., thirty-eight years of age, presented himself on the 29th of June, 1893, at one of the hospitals of Paris. The diagnosis proved the presence of a cancer involving the anterior portion of the lower maxilla and of the soft tissues of the floor of the mouth, extending to about one-third of the distance below the tongue. The surgeon decided on the removal of the diseased parts. I made a caoutchouc apparatus to replace immediately after the operation, according to the method of Dr. Martin, of Lyons, the osseous tissue about to be removed. By means of an impression of the lower and upper jaws, the height of the lower jaw was ascertained without any difficulty. The surgeon found it necessary to remove four-ninths of the transverse portion of the lower jaw, extending from the right lower cuspid to the left second bicuspid, all of the floor of the mouth, and the tissues of the hyoid region.

"The artificial piece having been made to correspond in size with the removed bone, it was at once placed in position and fixed by means of ligatures to the remaining two branches.

"The patient bore the operation well, and in one month was discharged from the hospital, the disease having been practically eradicated, the parts having tolerated this temporary piece very well. It was replaced by another temporary piece. As a result, the face has been conserved, the two branches of the lower jaw have been retained in their normal relation to the upper jaw, and on my return it is to be replaced by a permanent piece containing the necessary teeth."

In some of the cases treated by Dr. Martin, the amount of bone removed made it impossible to introduce an entire maxilla after cicatrization of the soft tissues had taken place. The substitute is therefore made in two parts, being joined together after it is in the oral cavity. Experience has demonstrated the fact that vulcanized rubber is kindly tolerated by the tissues, that it does not cause absorption if it is properly fitted and polished. These apparatuses are also provided with canals for irrigation. At some accessible point there is an opening into which a rubber tube attached to a syringe can be inserted ; the opening communicates with canals extending through the piece and opening at different points. The injection of an antiseptic solution will pass through these canals and emerge at the various points of exit, thoroughly cleansing and antisepticising the tissues with which the piece is in contact. Various means for the permanent retention of the piece are resorted to by Dr. Martin. In some cases, several rubber or metal points passing from the artificial transverse portion of the inferior maxilla will pass into the remaining natural rami ; in other cases, gold or rubber stays, lapping over on each side of the remnants, steady the piece, while to some there is attached one of the old-style spiral springs, at the other end of which is a plate covering the roof of the mouth. The constant pressure exerted by the spiral holds the piece down. Others, again, are held in place by clasps passing around remaining teeth, the method of retention being governed by the pressure of the muscles, which must be overcome.

Passing to the replacement of the superior maxilla, the results obtained by Dr. Martin seem almost incredible. There are practical cases on exhibit, involving all the way from a small portion of one of the superior maxillary bones to the replacement of both superior maxillæ with all their processes, including the floor of the orbit and malar bones. I have one case here which was in use by a patient to supply the loss of the entire superior right maxilla and a part of the malar process. A portion of the piece is made of soft rubber, is hollow, and is filled with either air or water. It was held in place by its fitting into irregular portions of the soft tissues. Most of the pieces of this kind are held in place by a spiral spring which carries a cap of gold or platinum fitted over the crowns of some of the lower teeth.

I shall make no further reference to the replacement of the hard and soft tissues of the upper jaws, by means of obturators, which is an extensive part of Dr. Martin's practice, except to show an ingenious way of reproducing flexibility and mobility, so often desired in these cases, which he attains by making artificial vela and soft palates of hollow soft rubber, afterward filled with air or water. This branch of prosthesis has many able exponents in our own country.

Going beyond the jaws, we have reproductions of the nose by a process and in a manner to me hitherto unknown. Dr. Martin takes an impression of the nasal cavity and any adjacent parts where the soft tissues, as the lip, the cheek, and, in one instance, even the eye, are lost. He makes a framework of platinum, somewhat resembling a tripod, which serves as the bridge and alæ of the nose. This is provided with some means for its attachment, according to the requirements of the individual case. Upon this framework is then modeled a thin film of porcelain, reproducing the lost parts in a manner almost marvelous. These are tinted and colored to correspond with the adjacent soft tissues, even reproducing thereon life-marks, such as warts, redness, etc., and, in the case where the eye was lost, the pupil, eyelids, eyebrows, and lashes, resulting in a piece of prosthesis that must transform a hideous creature into a person whose misfortune may not be apparent even to the casual observer.

In one instance the loss was confined to the ocular region only. It involved not only the eyeball, but the socket, and extended about a half-inch laterally beyond the outer corner of the eye, and upward, to include the eyebrows. In this case the patient was obliged to keep the socket constantly covered with cloth (so frequently seen by many of us in the streets), to prevent the discharge of the secretions of the lachrymal gland upon the cheek. Dr. Martin reproduced the appendages of the lachrymal gland, including the lachrymal duct, these appendages being at the same time the means of retaining the piece in position. Thus the secretion was guided in the proper channel, properly moistening the mucous membrane of the olfactory region.

To carry the subject even beyond this stage, we find Dr. Martin making artificial ears of porcelain. While it is true that breakage must be guarded against in all these cases, the extra precaution of the wearer is well repaid by the life-like and transparent appearance of the replaced organ. The difference between these parts being made of rubber and then painted, and being made of porcelain, is more marked than the difference between artificial dentures on rubber and continuous-gum bases.

In my opinion, had M. Godon been able to present these practical cases before the congress, that exhibit alone would have been worth the time of any one to visit the congress.

In concluding this part of my paper, I might add that the character of ability and accomplishment that makes it necessary for the surgeon and the dentist to go hand in hand, as they now do in the treatment of fractures of the maxillæ and the correction of palatal defects, will do more to elevate dentistry to a higher rank as science and art than anything else.

I also trust that some member of the profession in New England will take up this branch and develop it in this section of the country.

I desire at this time to refer to a character of replacement of dental tissue that may be practiced frequently by some, and quite often enough to make it worthy of the trial by many. The title of this paper enables me to contrast the subjects of implantation, transplantation, and replantation, considering the first as tardy prosthesis, and the latter two as examples of immediate prosthesis.

The operations themselves, that is, the methods, have been so frequently described during the last eight years that it is unnecessary to describe them now, and it is my intention to state to you only the results of my observations, and to point out the differences where one shows some preference over the other.

It is well to understand, in advance, that any of these operations can be performed successfully in limited cases only, and to the dentist whose practice enables him to give his patients the latest and most approved results, the cases become even more infrequent. Yet it must be borne in mind that instances arise where the line between the salvation or the loss of a tooth is very indistinct, and it is in these unfortunate cases that the dentist may be called upon to practice replacement. Should this be re- or transplantation, we have a case of immediate prosthesis, while if by neglect or some other cause the case of the loss of a tooth is left alone until the parts have cicatrized, we have a case for implantation or tardy prosthesis.

I will point out to you, in sequence, cases for the application of each class, and will endeavor to explain the reasons why I am inclined to believe that transplantation offers, in the majority of cases, the best results.

Concerning replantation, I might say that the subject is dismissed upon the presentation of the following brief statement:

1. If by means of our modern understanding of the treatment of diseases of the roots, "ulcers," pyorrhea, abscesses, etc., it is not possible to retain the tooth in the mouth, and extraction must be resorted to, the probabilities are that the root will be found in so pathological a condition as to make it unavailable for replantation. However, in cases where teeth are dislodged by accident or injury, replantation is a practice almost invariably followed by successful results. Occasionally, inaccessible deposits upon the roots will lead to a loosening of the tooth, and its extraction, cleansing, and replantation may be followed by favorable results. But, as a rule, successful cases for replantation are rare.

That character of replacement of dental tissue which I have designated as tardy prosthesis or implantation is also confined within well-defined and circumscribed limits. Yet I must admit that, judging from models shown by Dr. Younger, of San Francisco, Cal., at the late congress, I am either not fully conversant with the possibilities of the operation, or the skill of a specialist enables him to secure results beyond the reach of the average practitioner. Dr. Younger exhibited models of cases showing the implantation of from one to eight teeth in one maxilla. I have generally considered myself quite successful by securing one or two teeth satisfactorily in one mouth, and I must admit that the success attained by Dr. Younger in these operations, if they remain satisfactory for any reasonable length of time, is quite marvelous. My observation and practical experience with implantation leads me to reiterate the statement I have frequently made, that the subject is deserving of further investigation. If it is possible to implant a tooth and cause it to be satisfactorily retained for a period of six years, as I have myself accomplished, it remains only to ascertain the causes why in some instances the period of usefulness of these teeth is cut short in one, two, and three years. If an intelligent solution of these causes of failure is obtained, it may be possible to replace teeth in a large number of cases much more efficiently than it is done at the present time by plates and bridges.

I must express, however, my gratification at the results following the practice of transplantation, and wish to urge that practice upon the attention of members of this society. There is a period in the life of diseased teeth and roots when they must be condemned to the forceps, and there is at this time presented to the conscientious dentist an opportunity of replacement that is at once simple and inexpensive, and which has resulted in a sufficient number of successes to warrant more frequent application. If for any reason a root has passed the period when it is practicable for it to carry a crown in a healthy and comfortable condition, and when its extraction has been decided upon, it is a simple matter to procure a root approximately of the same size as the extracted one, or of the same size as the socket from which splinters and spiculæ have been removed, to mount upon it a Logan or any other crown, filling the margin between tooth and root in the manner shown in the specimen submitted for your inspection, and to place this in the socket, securing it by means of ligatures or, preferably, by means of a cap, to the adjoining teeth, and thus give the patient a useful and respectable member to his group of dentes,—an artificial substitute where art is concealed, and where the comfort and usefulness is not equaled by any means now at our command.

It has been my practice to wait from three days to one week after extraction before introducing the new tooth, believing that the retrogressive metamorphosis following the extraction of a tooth does not present suitable soil for the attachment of new tissue, and therefore I prefer to wait until the expiration of the period when the tissues are breaking down, and to plant the tooth at a time when the socket is filling with the soft pabulum whose ultimate object is to fill the deepest portion of the socket with new tissue, and thus obliterate the space caused by the removal of the former occupant. I have found that when a tooth is transplanted at this time the parts heal kindly, the tooth becomes attached more quickly, and the final result is in every way more satisfactory.

If I have aroused an interest in immediate prosthesis of either jaw, face, nose, eye, ear, or tooth, I shall feel well repaid for the time consumed in coming before you to read this paper.

A POTPOURRI OF PRACTICAL HINTS.

BY JOHN GIRDWOOD, D.D.S., L.D.S., EDINBURGH, SCOTLAND.

THE following hints, gained in practice, have proved so useful to me that I have been tempted to bring them under the notice of my confrères, in the hope that they may be of some little service. While they are original, as far as I am aware, it is probable that at least some of them may have been in use without having ever appeared in print; but for the reason that little things lead to greater, I venture to record them, trusting that if they are already known they may be improved upon by discussion, while if they are new, they will not be altogether uninstructive.

Probably many have experienced the same annoyance as myself when using the Perry separator on teeth the crowns of which are too short to permit of the bows resting on their cutting-edges or grinding-surfaces. The usual plan, in such a difficulty, of course is to place a piece of wood under each bow, to prevent the separator from setting up on the necks of the teeth and hurting the gum. But by this means it is frequently impossible to fix it securely, and the pieces of wood often become displaced in spite of the greatest care, with painful consequences to patient and operator., To obviate these, I have found the following plan thoroughly effective in securing perfect steadiness, and at the same time allowing of considerable pressure being put upon the separator without danger of displacing it. Take a small piece of sealing-wax, shellac, or modelling compound (the former I prefer), about the size of a bean, soften it till it can be molded between finger and thumb, and quickly apply it to the cutting-edge or crown of the tooth, and beneath and around the bow of the separator on each side. In a few moments it will be hard enough to prevent the trouble to which I have referred.

Clamps which, like the separator, tend to slip toward the gum can often be fixed in the same way.

In filling labio-cervical or buccal cavities, the slipping of the clamp —but this time off the tooth—is an annoyance which can also be got rid of by sealing-wax; but in order to appreciate its action one must remember *why* such clamps are unsteady. In the making of these devices a great deal of ingenuity has been expended, but few of them have been designed with any view other than that a firm hold should be got at the cervix of the tooth. Now, it is not always here that the mischief lies, because a clamp may grip firmly enough as long as it is untouched, yet a little pressure may cause it to rock, and so become displaced; therefore, if such rocking can be done away with, it follows that the appliance will not slip. Were it possible to make a clamp which would fit every case accurately, such a plan as I advocate would not be necessary; but as this cannot be had, the fitting must be supplemented, and for this purpose I employ sealing-wax or modelling compound,—the former where only a small quantity is needed. Mold a piece of the material chosen over the tooth on each side of the one to be filled, including that part of the clamp which is clear of the cavity, and you will find it hold in a way that will surprise you.

Those who practice porcelain inlaying have no doubt often found how difficult it is to grind down and smoothly finish inlays on the approximal surfaces of the teeth, when the space is too small to admit even the thinnest corundum disk. The ordinary emery-paper disks cut them down wonderfully fast indeed,—almost as fast as they do gold. They are even to be preferred to the corundum wheel on labial and some buccal surfaces when a great deal of grinding is not required, and for fine finishing are superior. For the final polish I use the ordinary cuttle-fish disk.

How to Make a Temporary Plate in a Few Minutes.—This I found it necessary to do a few weeks ago for a lady who had broken her lower plate, bearing the four lower front and some grinding teeth. She had an important engagement to keep in half an hour, and could not appear without her plate. As it was impossible to repair her plate in that time, I took a large piece of Gilbert's temporary stopping, and heated and molded it to her lower jaw to carry the four front teeth. I next selected these, heated and set them on the gutta-percha, cooled and removed the plate, sprinkled some powdered gum tragacanth on its under surface, and placed it in the mouth. She wore it with perfect comfort till late in the afternoon, by which time her plate had been repaired.

About the same time a young lady, a stranger to me, called one afternoon in great distress. Her right upper lateral, which had been badly necrosed and loose for a long time, had just come out. In an hour and a half her presence was required at a tennis party, and as there was no time to make a plate I thought of the following method of overcoming the difficulty. I took a small piece of hard wax, softened it and pressed it up into the space, and on it a tooth was set to fill the gap. I removed it, and had the wax replaced by quick-firing rubber in the laboratory. When it was vulcanized, I drilled four holes, two on each side, through the vulcanite, threaded a ligature through these, and tied the little vulcanite block and tooth to the adjoining natural teeth. While she was waiting, I had an opportunity of taking an impression for a small gold plate to supply the lateral and some back teeth. She was thus enabled to leave my office in little over an hour, and wore the tooth for more than a week, till the plate had been made. She was sorry to exchange her temporary tooth for the plate.

With regard to crowning teeth, some have no doubt met with cases like the following, where ordinary methods are not available. Miss L. called at my office to have a lower right first bicuspid crowned. There was a considerable portion of the lingual part of the crown standing, the buccal surface being decayed almost to the gum-margin. The coronal portion of the pulp was calcified, and she objected to having it destroyed, nor did I think such a course necessary. Here an all-gold or even porcelain-faced crown would have been too conspicuous, so I decided to apply a Logan crown,—*not*, however, with its ordinary pin, but with a cap and collar. I trimmed the root, leaving the lingual side a little high, and took a model and bite of it. A cap and collar were made to fit the root accurately and *tightly*. A suitable Logan crown was next selected, and the pin cut off. Into the countersink and around the stump of the pin I flowed pure gold, and then proceeded to fit the crown to cap and bite. A hole was next cut in the cap, and enlarged till it nearly corresponded in size to the gold base in the countersink of the crown. Cap and crown were now waxed together, and invested crown downward in plaster and marble-dust. This left the interior of the cap and band exposed, and through the aperture in the former all except the edge of the pure gold could be seen. The wax was then removed and the whole soldered. A slight groove was cut round the remaining portion of the root to assist retention, and the crown was cemented in place.

This method is applicable to some cases of abraded teeth. As described above it is superior to that advocated by Dr. Stowell, where the lingual border of the countersink is ground away till the gold is reached, and a clipping of platinum crowded into the aperture between the base of the crown and the cap, to form a head for the solder. To the most casual observer it must be apparent that this will weaken the lingual wall, whose strength, especially where the bite is close, ought to be carefully conserved. Moreover, by my plan the blowpipe flame does not play immediately on the porcelain, while in Dr. Stowell's it does so, at the risk of cracking it.

In a case such as already described there is of course the alternative method of applying any ordinary countersunk crown or a tube tooth, as mentioned by me in a former paper.*

In regulating teeth, it is sometimes necessary to use a rubber band in conjunction with a plate for drawing in an outstanding tooth. To get the required degree of tension, and yet prevent the band from slipping up and injuring the gum (as it is too apt to do), is often no easy matter. The following plan will be found to prevent this. Make a plate, thicken it a little behind the tooth to be moved, and cut it away to allow of the tooth's being drawn into place. Drill two holes about one-sixteenth of an inch apart in the thickened portion. Next cut a strip of rubber-dam about one-quarter of an inch wide, and tapered to a point at each end; thread these through the holes in the plate. Now tie a silk ligature round the middle of the tooth, making a knot in the center of the labial surface and leaving the ends long enough to tie the rubber with; then slightly soaping the rubber strip, pass the ends between the outstanding tooth and its neighbors on each side, and having drawn them sufficiently tight, tie in a single knot, also on the labial surface. Hold it here, and get an assistant to tie the silk ligature lightly round the rubber knot, and having done so cut rubber and ligature off short.

In crown-work, when taking a small impression and bite in plaster, done usually at one mixing by placing it over and around the root and making the patient close the jaws to secure the bite, I find that if the bite be very close, or there be any undercut, the plaster is apt to be very badly fractured in removing from the mouth, and the fragments are often very difficult to replace. In such cases, take a few threads of cotton wool, and having cut them fine with scissors, put a small quantity in the water before adding the plaster and mixing. A small quantity only should be used, otherwise the cotton will mat together in a lump. The cotton binds the plaster together, and the impression usually comes away without fracturing. Should it fracture, the separation of the pieces is so slight that they are easily pushed together.

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* See DENTAL COSMOS for September, 1893, p. 974.

TAKING IMPRESSIONS OF THE MOUTH.

BY JAMES W. WHITE, M.D., D.D.S.

THERE is probably no department of dental practice in which so large a number of practitioners find themselves at times unsuccessful as in the taking of impressions of the mouth. It is hoped that in these pages, advantage being taken of all the available literature of the subject, practical hints are presented which will be of service, at least to beginners, in helping them to the attainment of better results in practice. Without a correct impression of the mouth to begin with, no subsequent care or skill can secure a good result, no matter of what material the base may be composed.

The first thing to be considered is the character and condition of the mouth,—1, whether there are teeth remaining or not; 2, if so, their shape and position; 3, the character of the arch, large or small, deep or flat; 4, the ridge, irregular or smooth; 5, the state of the gums, if uniformly hard or soft, or hard in some places and soft in others, *e.g.*, ridge hard and palate soft, or soft ridge and hard palate.

When an artificial denture with a vacuum-chamber has been worn, or a plate or appliance of any kind has imbedded itself in the tissues, or caused irritation, it is well to have the patient leave out the plate for several hours previous to taking an impression.

Having ascertained all the difficulties to be overcome, the next step is to select a suitable tray in which to take the impression. This should be of such shape and size as will allow its easy introduction into the mouth; also adapted to the particular case in hand, and with reference to the material to be employed. It should be large enough to embrace the alveolar ridge, leaving a space of an eighth or a quarter of an inch between its outer rim and the gum. The nearer it comes within these limits to fitting the mouth, the less material has to be employed, the less pressure is required, the less surplus material to offend the patient, and the more perfect the impression is likely to be. On the other hand, it must not fit too exactly; else *drawing*, if the impression be of wax, or complicated *fracture*, if it be of plaster, will be almost certain to occur. The proper size should be determined by trial of the empty tray in the mouth.

More care is required in the selection of a tray for the inferior than for the superior jaw, for the reason that, owing to its divergence at the posterior part, and the extreme narrowness of the ridge, a slight variation will cause it to cut into the soft tissues and become painful to the patient, besides preventing a correct impression. The tray should pass well back toward the rami of the jaw and cover the border completely. If teeth are remaining, a tray specially adapted to such cases should be used, either deep enough to receive them or with a portion of the tray cut out to permit their passage; or an impression in modelling composition, wax, or gutta-percha should be first taken to approximate the required form.

A varied assortment of special trays is supplied by the manufacturers, adapted for partial upper and lower cases, and for crown- and bridge-work; others adaptable to varying necessities, the shape and size being readily adjustable by bending or twisting to meet unusual presentations of the teeth, gums, or palatal arch. In some the side-walls are cut free from the bottom, and in others the palatal portion is cut free, with slots running across the bottom toward the rim. Some are made with flat bottom and square sides, and others with raised palatal edges, to prevent the plaster slipping off the tray ; still others with the rim of the tray adjoining the handle cut away, so as to procure a perfect impression of undercuts or shelving gums. For partial lower dentures trays are provided with an opening to allow the front teeth to pass through, and the tray to pass down to the maxillary ridge. An adjustable lower impression-tray suggested by Professor Henry I. Dorr has posterior lingual wings, which enable the operator to obtain an accurate impression of the jaw on either side of the tongue, the wings being easily spread apart or brought toward each other, or twisted to adapt the tray to almost any size or shape of the edentulous lower jaw.

A temporary tray may be made from an impression of modelling composition or of gutta-percha, which will answer a very good purpose ; but it should be enlarged by cutting away around the alveolar border and palatal arch, and roughened to retain the material used.

A modification of the ordinary tray may readily be made with modelling composition or with wax, to adapt it to a special case, provided it be of sufficient size to admit the necessary additions. In some instances better results may be secured by bending and refashioning a britannia tray ; in any case, the tray should possess a reasonable adaptation to the alveolar ridge and palate, if a perfectly satisfactory impression would be secured. The objection to the porcelain tray is that it cannot be modified to suit special cases, and is so smooth that the impression material may leave it and cling to the mouth. This, however, if considered desirable, can be provided for by oiling a metallic tray. If the smoothness of a new britannia tray is objectionable, a little roughening of the surface will cause the plaster to adhere.

Having decided upon the tray to be used, the next question to determine is the material to be employed.

If the object sought in taking an impression is to obtain a correct representation of the parts as they are in their normal condition, there is needed a substance plastic at ordinary temperatures, and which will admit of having the parts concerned pressed into it without the use of force enough to cause pain or disturb the relative position and form of the different surfaces. It must also possess sufficient hardness or body to be retained in the tray under the pressure necessary to obtain an impression of the parts. It must solidify or harden in a brief time, and under conditions as to heat and moisture not incompatible with the mouth. It must not materially contract or expand in cooling or hardening, and at the same time should as nearly as possible be free from objections as to taste, smell, or appearance.

The substances or compounds in use differ widely in their physical characteristics,—wax, white and yellow ; combinations of wax with paraffin, with gutta-percha, and with other materials ; modelling composition ; gutta-percha, alone or in different combinations ; plaster of Paris, alone or conjoined with the use of wax. It would doubtless be unsafe to say that in all cases one of these materials will answer as well as another. Plaster of Paris is used almost exclusively by a majority of practitioners. Next in order as to extent of use is modelling composition, then wax and wax compounds, and lastly gutta-percha.

A knowledge of the distinctive properties and applications of each is desirable.

When it is desired to displace soft parts to obtain a uniform bearing for a denture, the absence of elasticity in wax is considered an advantage. By others insistence is made as to the necessity of an exact copy of the parts as they present, subsequently carving it to adapt it to the requirements of a denture. From this standpoint plaster of Paris would be the most desirable material for taking the impression.

A metallic plate struck up on a zinc die is smaller than the mouth, by reason of the shrinkage of the die,—unless this shrinkage is compensated for by the enlargement of the sand impression in removing the mold ; a vulcanite plate is larger than the mouth, because of the expansion of the cast,—unless this expansion is counteracted by the shrinkage of the material in vulcanizing : consequently the compression made by the force required, in taking an impression in wax, or the contraction of gutta-percha, may be made to serve a useful purpose. It is evident, therefore, that no definite rule can be given applicable to all cases ; very much must be left to the judgment of the operator. It is frequently difficult to decide in advance which is the best material for a given case, and experiment alone can decide.

In the following pages the use of wax is treated of first, because it is the material which is usually chosen by beginners, on account of the ease with which it is manipulated, and also because the general directions for its employment are alike applicable in the use of other impression materials.

In cases of irritable fauces, inducing nausea, it has been recommended to lessen the irritability by previously gargling with a strong solution of tannin, or potassium bromid, or with camphor-water ; others have recommended that the fauces be accustomed to the presence of a foreign body, by passing the feather end of a quill over the parts a few times before taking the impression, or by directing the patient to manipulate the parts frequently with a spoon for a few hours previous to the impression being taken. Such manipulation will, however, sometimes cause nausea and vomiting, especially if practiced after taking a meal. Others consider that the surest way to prevent retching is to force the patient's chin well down upon the breast, after the tray is in place, and so retain it until the impression is removed. Others, again, direct the patient to place the tongue upon the posterior portion of the tray, and retain it in that position. The act of swallowing is likely to produce a sensation of nausea by bringing the soft palate into contact with a foreign body ; the patient should therefore be advised to avoid swallowing during the operation. Nausea is frequently induced by the tray extending too far back in the median line (a fault with many of the trays on the market), and by the use of too large a quantity of impression material. In exceptional cases of extreme sensibility of the mucous membrane to contact with any impression material, a five per cent. solution of cocain applied lightly over the soft palate is said to have proven satisfactory. In like cases the administration of a few inhalations of nitrous-oxid gas has effected good results.

The insertion of the tray may seem a trifling matter to the operator, but is frequently not so to the patient. Few lips will admit an impression-tray direct without an amount of stretching at once inconvenient and painful; and, in some cases, to secure a correct impression without subjecting the patient to serious discomfort, will require no little care and expertness on the part of the operator. Unusual width of the jaw is not infrequently associated with a contracted commissure, and, in addition, the muscles of the mouth may be rigid and unyielding. Another difficulty is in the common attempt of the patient to open the mouth wide in an effort to assist the operator. The patient should be directed to guard against this by allowing the jaw and the lips to be entirely under the control of the operator, who, standing to the right of, behind, and over the patient, should present the tray obliquely to the mouth, one side resting against and pressing outward the corner of the mouth, while the opposite corner should be extended with the first and second fingers of the left hand; the tray should then be passed in with a rotatory movement to bring it into line.

BEESWAX.

When wax is used, either a *pure* article should be obtained, or that which has been judiciously combined with a foreign substance for the specific purpose. Commercial adulterations with tallow, resin, vegetable wax, etc., injure it, making it difficult to manage. White wax has an advantage over the yellow, in that it does not so readily draw out of shape, and there is consequently less liability to have the impression distorted than with yellow wax. It takes a sharper impression than the yellow, but it is more difficult to bring to the required plasticity, and more force is required to obtain a correct impression. In summer-time the additional hardness is in its favor.

Scrap wax of either variety should never be used without remelting, as it is difficult, if not impossible, to get it into a homogeneous mass. The difficulties in the use of wax are: That the pressure required forces all the soft parts out of normal position, and renders a perfect impression of some mouths with it impossible; the tendency to lose its form in withdrawing is also a serious objection to its use. It is inelastic, and contracts very slightly in cooling. It does not give as delicate a result as plaster, but is still preferred by some operators.

Paraffin is frequently added to wax, and imparts to it the property of becoming plastic at a lower temperature. A small quantity improves it, especially for use in cold weather; but if in excess, it causes the wax to separate into layers, which are not easily reunited. It takes a sharper impression than wax alone, with less liability of drawing out of form; the addition of the paraffin in proper quantity causing the composition to be harder when cold than the wax alone. A combination of wax and gutta-percha is used, and highly prized by some, on account of its toughness. The objection to it is, that it is sticky. It will adhere to the plaster in taking a model unless previously varnished.

Having decided to use wax of either variety or combination, examine the mouth before taking the impression, so as to see the position of the teeth, as a guide to its introduction and withdrawal in a line with their axes, in order to prevent dragging.

In case of a high arch, select a tray adapted to it, or pile up the wax in the tray to correspond with the form of the mouth. For such cases, some operators cut a piece from the central portion of the tray, large enough to admit the finger, and thus force the wax into the deeper portions of the arch. The practice of others is to dry the mouth with a napkin, and then fill the palatal arch with soft wax, down to a point nearly on a line with the alveolar border, keeping the surface of the wax dry; over this, to apply the impression-tray with the wax quite soft, and thus obtain a perfect impression.

Bring the wax to a plastic state either by dry or wet heat, being very careful in either case not to overheat it, or produce the peculiar whitish appearance which precedes melting; the wax is spoiled if heat enough is used to liquefy the surface. Water has the advantage of softening the wax more thoroughly and rapidly, and it can thus be worked up without adhering to the hands, which is an annoyance in the use of dry heat. An objection, however, to the use of water is, that more or less moisture is worked into the wax, destroying to some extent its tenacity. A dry heat makes it tougher, but more care is required to prevent it from being overheated. If water is used, a large bowl, with plenty of water, is desirable to secure uniform heating, and a thermometer should determine the temperature. Less than 120° will not suffice to make it as plastic as it should be; over 130° will cause it to become adhesive. A better condition of the wax will be secured if it is allowed to heat up with the water. Of the two methods, there can be no doubt that careful dry heating will produce the best impression; moreover, the wax will not be liable to leave the tray and remain in the mouth, as it sometimes does when wet heat has been employed. Whether dry or wet heat is used to soften, it must be thoroughly worked until all lumps are removed. Some operators are in the habit of softening the wax by warm water; subsequently absorbing the moisture by working it in a dry napkin, and then bringing it to the desired plasticity by dry heat. This plan will save time when the wax is in mass.

It has been recommended that the operator should be governed by the condition of the mouth with reference to the softness of the wax. When the gums are uniformly spongy, the wax should be made quite soft; but in cases where the maxillary ridge in front is soft and yielding, it is well to have the wax quite hard, so as to press it as closely as possible, otherwise the pressure in biting will force the plate up, and make it cant or rock on the hard palate.

Direct the patient to rinse the mouth with warm water before taking the impression, to remove the mucus. Wiping the teeth with a pledget of cotton carrying a little glycerol, sweet oil, or vaseline, proves a useful preliminary to an impression with any material. When the wax is in a soft, plastic state, it should be immediately placed in the tray, previously heated to secure adhesion, avoiding the use of too large a quantity (which is the usual error of beginners); the surface warmed, and promptly inserted in the mouth, care being taken to secure the proper position of the tray with reference to the ridge, so that no portion of the rim may cut into the soft tissues; it should then be gently but steadily forced up against the parts (passing the finger around the outside of the tray to permit the rim to pass up between the cheeks and gums without drawing the mucous membranes) until the ridge is completely imbedded, and the wax closely pressed against the palatal surface, and held there for a few moments to allow it to cool and harden. The tray should be held steadily and firmly, with two or more of the fingers of each hand on the under surface at about the position of the first bicuspids, the operator standing to the right of, behind, and over the patient.

It is better to have the sides of the tray high enough to give the wax support at all points ; but if any is pressed above the edges, it should be brought into contact with the gums by pressure of the finger against the cheeks and lip, so as to insure the filling of all depressions, irregularities, or interdental spaces. Special care should be observed in cases having a prominent ridge. The wax extruding at the palatal edge of the tray should be pressed back into the vault with the finger. The wax must be kept in the mouth long enough to cool and harden. To facilitate the hardening process, cloths dipped in ice-water, or a thin piece of ice wrapped in a napkin, may be applied to the under side of the tray, though there is some risk that the sudden reduction of the temperature of one side may cause unequal contraction. If there has been too much wax used, and the impression is injured thereby, trim off the surplus, dip into warm water, and introduce it a second time ; this plan will not answer as well, however, in partial cases, as the teeth will not enter precisely where they belong in the impression. If the teeth have been recently extracted, the wax should be quite soft to avoid pressing the soft tissues out of place.

Great care is necessary in withdrawing the impression. The partial adhesion by atmospheric pressure tends to draw the wax out of shape, as does also that produced by the adherence of the wax between the approximal surfaces of the teeth ; the impression-tray must therefore be held perfectly firm, allowing no vibration in any direction until clear of the teeth. If the attempt be made to draw it forward, the wax will be forced out of form, and the impression rendered proportionately imperfect. Care must also be taken to have the tray sufficiently depressed to avoid abrasion by the teeth in its removal, the patient being instructed not to open the mouth too much, as by so doing the width is contracted, and there is liability that the impression may be distorted in passing it through the lips.

If the impression should adhere tightly to the mouth, as is sometimes the case, its removal may generally be effected by withdrawing the tissues of the cheek, or lip, or by directing the patient to give a slight cough, or to blow through the mouth, which admits air, and so breaks up the atmospheric pressure ; or, preferably, by having a hole in the center of the tray, through which a blunt instrument may be passed up to the palate. Any little displacement of the wax which may be thus caused will not be objectionable, because it will be in the spot where the vacuum-chamber is required.

Immediately on the removal of the impression, it should be put into a bowl of cold water, or held under the stream of a hydrant, in order to restore its natural hardness, and thus lessen the liability to a change of its shape from handling.

To take an impression of the inferior ridge, a tray adapted to the case in hand having been selected, it should be filled flush with its margins, and introduced in the same manner as directed for impressions of the upper jaw, the operator standing either behind and to the right of the patient or in front. If behind, pressure should be made upon the tray with the thumbs about over the position of the bicuspids ; counter-pressure with the fingers under the jaw. If the position of the operator be in front, two fingers of each hand should make pressure upon the tray, while the counter-pressure should be made with the thumbs beneath the jaw, which may be protected by a folded napkin. It is important to draw out the cheeks before making pressure upon the tray, as the soft tissues are apt to overlap the posterior margin of the alveolar border. The patient ought then to be requested to thrust the tongue out of the mouth as far as possible, so as to free the soft tissues from entanglement. Firm and steady pressure should thus be made, until the ridge is entirely imbedded, when the wax should be pressed around the margin of the tray into all irregular surfaces or depressions, especially against the overhanging ridge at the angles of the jaw.

Dr. Thomas Wardle invented a tray, which he brought to the notice of the profession many years since, and which is still used by some operators, for taking impressions in wax, either for partial or full dentures. This tray was designed principally to overcome two obstacles in the way of obtaining a correct impression, viz: where, in cases requiring a partial plate, the crowns and convex sides of the remaining teeth prevented an accurate impression at the necks ; and cases in which a contracted and high arch made it difficult to obtain an impression with the ordinary tray.

This tray is supplied with a movable palate plate, so adjusted that it is capable of forcing the center of the wax up against the highest part of the arch, as well as laterally against the palatal sides of the necks of any remaining teeth, thus securing an exact impression of the parts within the alveolar border.

In the use of this appliance, a suitable palate plate having been selected and placed in position, the tray is filled with wax, inserted in the mouth, and an impression secured as with an ordinary tray. Then—great care being taken not to permit the tray to be moved from its position—with a *stout* plugging instrument, curved or turned at a right angle, pressure should be made against the projecting end of the bar until it will yield no further.

Modelling Composition.

This material is composed of gum copal, stearin, and French chalk. It is made in several grades, designated as soft, medium, hard, and extra-soft. The soft is for use in cold weather and in tender mouths, as after the recent extraction of teeth. It softens at a low temperature, and is slow in hardening. The medium is adapted to general use, requires a higher temperature to soften, and sets quicker than the soft. The hard is designed for use in warm weather, and requires a still higher temperature to soften it. The extra-soft is used for mixing with any other grade where a modification of its qualities is desired.

Modelling composition of a good quality takes a very sharp impression, and is adapted to cases of irregularly placed wedge-shaped or bell-crowned teeth, or where the teeth incline inward, or in cases of overhanging ridge ; its elasticity at a certain stage of cooling causing it to regain its original form after displacement in the act of withdrawal. By judicious manipulation it can be made serviceable in displacing soft tissues where such a result is desired.

The general directions as to the employment of wax are applicable to the use of modelling composition, and trays such as are adapted for taking impressions in wax are suitable also for use with this material.

The directions for its use are to bring water to the boiling-point in an open vessel ; remove from over the flame and put in the composition, which when soft take out with a spatula or spoon, and knead with wet hands into shape to fit the impression-tray, which should be previously warmed. Pass through the flame to glaze the surface, and place at once in the mouth. Hold steady a half-minute ; push the lips and cheeks in firmly, and with the finger in the mouth press against the palatal or lingual parts. When properly cooled,—the time depending upon the grade used,—carefully remove from the mouth and plunge into cold water, *allowing it to remain there until hard.*

To determine when the impression should be removed is a matter requiring some experience and judgment. A test of its condition may be obtained by pressing the thumb or finger-nail into any protruding portion, and observing the character of the response.

The whole secret of the successful manipulation of modelling composition lies in working it at such a degree of softness as will carry it beyond its contractile condition, and making discriminating use of its elastic properties.

GUTTA-PERCHA.

Gutta-percha has been extensively used, and is still esteemed, by some, for special cases. One great cause, perhaps, of the difference in the estimate of its value by different practitioners, is in the quality of the article used. It is liable to undergo a marked change by exposure to the air, losing its toughness and elasticity ; it is then very brittle when cold, and exceedingly sticky when warm. If of good quality, it is easily made plastic by wet heat without sticking to the fingers ; if it will not bear this test, it is not fit for use in taking impressions.

When of good quality, it will take a sharp and delicate impression, but is liable to change its shape when withdrawn from the mouth,—its tendency being to contract very decidedly on cooling. On this account it is used by some in special cases in which the plate is liable to be loose. Various suggestions have been made to improve it as an impression-material by combining it with other substances, such as magnesia, or chalk. In such combinations it becomes harder when cold, is less sticky when warm, and less liable to contract in the process of cooling. It will take slight undercuts, and, in consequence of its elasticity, with less dragging than wax, but is apt to pass into narrow spaces between the teeth, and the force required to dislodge it injures the impression.

For taking impressions in gutta-percha, the tray should approximate the size and shape of the mouth, so as not to leave in one part more than another a superfluous thickness of the material, thus avoiding irregular contraction in cooling, and drawing or sucking in the act of withdrawing it. It should be well worked, and freed from bubbles; after which manipulation the surface should be dried, and held for a few moments over a spirit-lamp, and put into a previously warmed tray. This will cause it to adhere to the tray, and so prevent withdrawal from the sides of it, in cooling. If it is desired to take advantage of its property of contracting, it may be dipped again in the water when ready for the tray, which ought also to be wet and cool.

While the impression is still in the mouth, the surface of the tray may be cooled with ice, or a sponge dipped in ice-water; but if the impression is a thin, delicate one, there is danger that the sudden cooling of one side may cause unequal contraction. Care should also be used not to make it too hard, when there are dovetail spaces between the teeth, or when the teeth themselves are wedge-shaped or conical. A little plaster batter pressed with the end of the finger into the spaces between the teeth, and allowed to set, will prevent wax or gutta-percha from entering. After the impression is taken, the plaster can be removed with an excavator. It is well to dip the impression into cold water immediately upon its removal from the mouth.

One operator teaches that excellent results may be obtained by the proper manipulation of gutta-percha, which consists in dipping thin sheets of it in boiling water; taking them out on a glass rod; dipping them into cold water; then filling the tray and placing it in hot water for half a minute; dipping once more into cold water, and promptly introducing the tray into the mouth. He directs that it should remain in the mouth until it is found by testing with the finger-nail that it is just cold enough to spring back into place if moved.

No oil or other substance should be put upon a gutta-percha impression before filling with plaster. To remove the impression from the plaster model, it should be put, when the plaster is hardened, into water, of a temperature from 190° to 200°, and allowed to remain until the gutta-percha is entirely softened.

Plaster of Paris.

This material has now been for many years in general use for this purpose, and its merits are fully established. It requires nicer manipulation, and is not so cleanly as wax; but the results are so nearly certain, that they counterbalance any inconveniences attending its use. It readily conforms to the minutiæ of shape and irregularity, and if broken presents clean, sharp, well-defined fractures which permit accurate replacement; the pieces being retained in place by a little melted wax dropped upon the lines of fracture on the outside of the impression. It is chemically a native sulfate of lime, found in great abundance in many parts of the world. In its crude state it is called gypsum, and is prepared for use by being reduced to a fine powder, and subsequently calcined in ovens at a temperature between 300° and 400° F. If overheated, it parts with all of its water, and fails to recrystallize when mixed with water. This accounts perhaps for the imperfect solidification of some specimens of plaster. It is sometimes impure, by reason of original or subsequent admixture of foreign substances.

A difficulty may also arise if the plaster has not been ground sufficiently fine, in consequence of the setting taking place before the coarser particles have absorbed their quantum of moisture. In this case, the expansion, instead of taking place, as it should, while the plaster is soft, is continued after it has solidified.

When pure, properly ground, and calcined, if mixed with water, a chemical union takes place, which is commonly called a "setting,"—the combining water condensing from a fluid to a solid, and liberating latent heat, as is usual in such changes, with a consequent elevation of temperature. This quality of setting depends, moreover, not only upon its original purity and correctness of manipulation in the manufacture, but largely upon subsequent care in keeping it, and the manner in which it is mixed for use. As it has the property of absorbing moisture from the atmosphere, it should be kept in a metallic, earthen, or glass vessel, perfectly covered, and in a dry, *warm* place. Frost injures its quality. Plaster which does not work well, by reason of the absorption of moisture from the atmosphere, may frequently be restored by submitting it, in a dish or other vessel, to the ordinary temperature of the baking-oven of a cook-stove until it is thoroughly warmed through. It will not work satisfactorily if cold.

Presuming that it is a pure article, has been properly calcined and ground, and carefully kept, the next item of importance is, that it be properly mixed. It should be passed through a sieve of bolting-cloth previously to being used. Warm (not hot) soft water is the best, if it is desired to have it set quickly. The temperature of the water used will decide largely the time required for its solidification. There is less liability of air-bubbles if warm water be used. The quantity of water used will also determine the period required for the setting ; the less water the quicker it will set ; but plaster mixed stiffly will always contain bubbles.

The best method of mixing is to take the required quantity of water (easily determined by experiment), sprinkling the plaster into it, until of sufficient consistency ; if the reverse plan is pursued—the water poured into the plaster—it will crystallize unequally, and be filled with air-bubbles. A teacup or bowl is the best form of vessel to mix it in. Thorough stirring or beating makes it tough and pasty. The longer it is agitated and beaten, the less subsequent expansion there will be, for the reason that each granule becomes saturated (satisfied) before solidification takes place ; whereas, if too little water be used, or the plaster is allowed to set before the center of the granules is saturated, they will continue to absorb from their surfaces, and expansion will continue with some plaster for a considerable time.

A question has been raised in regard to the expansion of plaster in the process of recrystallization or setting. That it does expand is admitted, but as it is only about $\frac{1}{500}$ of its own measure, it is not sufficient to interfere materially with the success of an artificial denture. It is claimed, and if true it is a curious fact, that it expands less or not at all when salt or potash-alum has been added.

To facilitate the setting, many different substances have been recommended, such as common salt, potash-alum, potassium sulfate, sodium silicate (liquid silex), etc. Of these, the alum and silicate are unpleasant in the mouth, and the latter is unreliable, making the plaster set too quickly, while the potassium sulfate does not appear to possess any superiority over common salt (except that a very small quantity suffices, and in making models it causes no efflorescence). A small pinch is all that is required for an impression; an excess will cause too prompt setting, and will effloresce, and make the impression rough on the surface,—the tendency to which, however, will be obviated by promptly varnishing it after its withdrawal. A *large* excess of salt will retard the setting. The varying effects of different quantities are shown in the following results, obtained from a single sample of plaster, the quantity of water and plaster being in each case the same: The plain plaster set in five and a half minutes. The addition of two grains of salt caused it to set in five minutes, of four grains in three and a half minutes, of eight grains in three minutes, of sixteen grains in two minutes, of thirty-two grains in one minute, of sixty-four grains in two and a quarter minutes, of one hundred and twenty-eight grains in eight minutes, and a saturated solution required twenty-four minutes. Some operators keep ready a pint bottle of water in which has been dissolved a heaping teaspoonful of potash-alum for use in mixing plaster for impressions.

The practice of some is to add the salt to the water; others consider that the best time for adding it is when the plaster is ready for use, and just before it is put in the tray,—the salt thus beginning to act as the plaster is introduced into the mouth, allowing the use of a thinner batter, and yet insuring a speedy setting. The addition of the salt prevents the plaster from becoming as hard as it otherwise would; but for impressions this is not an objection.

Plaster should not set too rapidly, nor should it be too long in hardening; but if a choice has to be made between the two conditions, the latter is to be preferred, for the reason that the slow-setting plaster gives the operator ample time for preliminary management. He should never be hurried, and this is likely to be the case in quick-setting plaster. This is of more importance than is generally considered. If it is desired to retard the setting, a solution of white glue, sugar, molasses, or vinegar may be added to the water with which the plaster is mixed.

The suggestion has been made that three or four drops of oil of wintergreen, or cinnamon, added to the water with which the plaster is mixed, agreeably modifies the objectionable taste of the plaster.

Dr. L. C. Ingersoll advises adding to plaster of Paris from one-third to one-half of pulverized pumice, according to the strength of the plaster. By this means he claims that adhesion to the teeth is almost entirely prevented, and that there is less liability to fracture of the impression on its removal from the mouth.

Some always take an impression first in wax, giving it a lateral, anterior and posterior movement in the mouth, or subsequently enlarging it by cutting, so as to give space for the batter of plaster with which the final impression is afterward taken. This method is considered specially applicable when the mouth is not uniformly hard,—in some places soft and yielding,—the object being to allow trimming off the impression corresponding to those places where the tissues are yielding, in order that a greater depth of plaster may be brought into contact with them, which, being softer than the wax, will allow them to retain their relative normal positions. After the wax impression is taken for this purpose, the surplus wax should be trimmed off, and the surface scored, to make retaining-points for the plaster. To prevent the wax from leaving the tray, its surface should be warmed over a spirit-lamp.

For a full upper impression wholly of plaster, the mouth should be carefully examined, and the proper tray selected, one as near the size of the jaw as possible; if it is a high arch, the center of the tray should be filled up with wax, and with the same material any deficiency in the size of the tray at the palatal margin or around the outside edge, especially over the cuspids, should be supplied. Many failures are unquestionably attributable to a want of support in the summit of the arch, admitting the too great bulk of plaster to drop before solidification takes place; a difficulty obviated by having a smaller quantity of the batter sustained by a dome of wax. Some operators recommend a rim of wax to be carried entirely around the periphery of the cup, including the posterior margin; the object being to enable the operator to press in the plaster above the alveolar border, and to prevent in part its being forced too rapidly or in too large quantities over the posterior margin; but care should be taken that this rim be not deep enough to press unduly upon the soft palate, and distort the impression.

If the alveolar ridge is very deep, or presents the form of a fissure, making considerable space between the tray and the floor of the palate, the tray should be driven up on a mold, so as to make it correspond with the form of the mouth; otherwise the plaster will not be carried to the deepest portion of the arch, and thus there will be an imperfect impression of the palatal surface. Another plan is to take up a small portion of plaster on the finger or a spatula, and apply it to the deeper parts of the arch just prior to the introduction of the tray; the patient being already seated, with a slight forward inclination of the body.

When about to take a plaster impression, a towel or large napkin should be spread in the lap of the patient to receive any excess of plaster which may be dislodged.

The patient may be directed to dry the mouth with a soft napkin if there is an excess of saliva; but it is rarely if ever necessary in taking impressions of the upper jaw, and some mouths are naturally so dry that the difficulty is rather to prevent the plaster from adhering too firmly to the tissues. In such cases, it would not be well to absorb what little moisture there might be. Some operators always direct the mouth to be rinsed with warm water, which, it is claimed, by removing the mucus, facilitates a more even flow of the plaster; diminishes its liability to an undue adherence to the membranes, and produces a smoother and more delicate impression. Some always brush the parts over with glycerol, if the mucous membrane appears abnormally dry.

Before introducing the tray, some operators instruct the patient to breathe through the nostrils, considering that the liability of fragments of plaster being drawn into the pharynx is much increased when the patient breathes through the mouth.

The late Dr. Joseph Richardson took, however, an opposite view, arguing that in the act of breathing through the nose the velum palati is depressed to cut off the passage of air through the mouth, and is thus brought more immediately in contact with any portion of plaster that may be protruding from the heel of the tray; that the stimulus of contact produces involuntary contraction, and that thus fragments of hard plaster may be drawn back into the fauces, producing the very evils which nose-breathing is thought to avoid ; and that if patients are instructed at all in this respect, they should be advised to breathe through the mouth.

The required quantity of water, say two tablespoonfuls, should then be put in a bowl or teacup, a pinch of salt added, and plaster sufficient to make a batter about the consistence of thick molasses should be *sprinkled* in. If put in carelessly, it will become lumpy, and may prove disastrous to the impression. The batter should now be well stirred and transferred to the tray.

The filling of the tray should be commenced before the plaster has set to the point suitable for insertion in the mouth. Sufficient should be used to insure the filling of all spaces, with a small quantity to spare. A knowledge of the amount necessary can only be acquired by experience ; too much makes it difficult to insert, and will also cause a larger amount to be forced over into the mouth,—a result always disagreeable to the patient and unpleasant to the operator. The rule generally given, to wait until the plaster fails to fall from the spatula, is an error. It is then too stiff to put into the tray ; allowance must be made for the time required to place it in the mouth. So long as the surface glosses, when smoothed with the spatula, and does not begin to leave sharp edges, it will take a perfect impression with *very moderate* pressure. The perfection of the impression will mainly depend on its insertion when the smallest possible pressure will be required ; but if too thin, difficulty will be experienced from its spreading and running from the tray.

The patient should be seated,—a common chair is preferred by many operators,—and instructions given as to position and the reasons therefor ; the patient inclining the body slightly forward, and in readiness when the plaster is introduced to allow the head to be thrown still more forward,—the object being to determine any excess of plaster to the front of the mouth, and prevent it from falling into the fauces. Too many directions and an ostentatious preparation will, however, cause failure with timid patients, by inducing undue nervous irritability, from a magnified fear of the operation.

When the tray is introduced into the mouth, it should be passed up to the palatal arch, touching the posterior of the palate first. This is to throw all excess of plaster anteriorly. It should then be brought gently up over the anterior surface, until the parts are completely imbedded and the plaster is seen to protrude around the margins of the tray, and held there with no more pressure than will suffice to keep the tray in place until it sets. The tray is best held in position by pressure of the second finger against its palatal portion. At the same time the lips should be extended and brought down over the tray, subsequently making pressure on the lip and cheeks to force the plaster well up on the outside of the ridge. The liability of having an excess of plaster pass backward toward the pharynx is a real danger. A serious accident of this nature might readily occur. It not infrequently happens, when the tray is pressed anteriorly first, that a large excess will pass over and interfere with respiration. This excess is liable to fracture when hard, and, becoming loose, may pass into the pharynx and endanger the patient. To obviate this, it has been suggested to place around the palatal surface of the tray pieces of string, extending slightly beyond the posterior margin, which, becoming imbedded in the soft plaster, will draw out any portion that may become loose. This precaution is, however, unnecessary, if care is taken not to use an excess of plaster, to bring the posterior portion of the tray first into contact with the palate, and to have the patient lean well forward.

When the tray fairly covers the ridge, a slight vibratory motion should be given to it to settle the plaster and dislodge any bubbles of air ; at the same time the head of the patient should be thrown well forward and the body still more inclined. The formation of air-bubbles in the roof of the mouth cannot be thus prevented ; this liability must be guarded against by having the plaster high enough in the center of the tray.

When the alveolar ridge is much absorbed, the foldings of the mucous membrane should be prevented from becoming involved by pressing them out with the fingers. The tray should be retained in *exact* position with great care until the plaster sets. The operator should always hold the tray, never trusting it to the patient. It should be retained in position, not by the handle, but by one or two fingers of the operator's right hand upon the center of the tray, with his left hand resting upon the patient's head.

To judge when the plaster is hard enough to remove from the mouth, the evolution of heat, as the result of the chemical action which has taken place, will be a guide. It has been recommended to test by the fracture of the plaster left on the edge of the bowl in which it has been mixed ; but, while some say that the secretions of the mouth feed the plaster and prevent it from hardening as soon as that in the bowl, others contend that the heat of the mouth causes it to set somewhat quicker. The safest plan, therefore, is to test that on the edge of the impression, or to know by previous trial the "behavior" of the plaster used, and determine by the *watch*.

On withdrawing the tray from the mouth, the upper lip should be stretched upward, at the position of the second bicuspids, with the left hand, so as to admit air between the plaster and the gum ; at the same time the tray should be pressed downward with the right hand. If the plaster is left in the mouth too long after it hardens, there is likely to be a very strong adhesion of it to the mucous membrane, owing to the absorbing property of the plaster. In such cases no undue force should be used in the withdrawal, as there is liability to tear the membrane ; the only plan is to *coax* it out. The tissues of the lip and cheeks should be lifted alternately, and, if necessary, the patient directed to give a slight cough ; or, make upward pressure upon the handle of the tray, which will depress it at the heel ; or, with a suitable instrument, the soft palate should be pressed up to admit the air ; or, preferably, through a hole in the center of the cup, a blunt instrument may be passed up to the palate, and thus admit air between it and the impression. By this means there is less danger of injuring the impression than by introducing air at the sides, which can only be done by more or less depression of the tray. These means will generally, with a little patience on the part of the operator, effect its removal without damage to the mouth or to the impression. A pair of foil-pliers should always be at hand, to take out of the mouth any pieces of plaster which may break in the act of withdrawing the tray. These should be rinsed clean of saliva, and replaced, after hardening, with great care and nicety.

It has been recommended, to facilitate the removal of an impression, to make a small hole in the center of the tray, and pass through it a fine cord or thick thread, so that a quarter of an inch of its end shall project from the surface of the impression-material. Before removing the impression draw out the cord, and thus admit air to the vault to facilitate the detachment of the impression.

As a further aid in overcoming persistent retention of an impression, ask the patient to perform the act of swallowing.

In taking impressions of the lower jaw, for a full denture, the tray should be adapted to the case in hand as to depth and shape of rim, which should extend downward on its lingual extremities so as to secure an accurate impression of the lingual aspect of the ridge. It is necessary to allow the plaster to set until it will not drop from the inverted impression-tray. It should be then placed in the mouth, and carefully depressed at the posterior portion first. When there is an excess of saliva, care should be taken to have the mouth of the patient dried with a soft napkin. After filling the tray flush with its margins, the operator should introduce the tray into the mouth in the manner heretofore described, standing to the right and back or in front of the patient. If the latter position has been chosen, after having adjusted the tray properly over the ridge, the first two or three fingers of each hand should be placed upon the top of each side of the tray, over the position of the bicuspids, and the thumbs underneath the jaw, steady and firm pressure being made until the ridge is wholly imbedded, the patient sitting in the position recommended in taking upper impressions. If the operator stands behind the patient, pressure should be made upon the tray with the thumbs, and counter-pressure with the fingers under the jaw, care having been taken to draw out the cheeks before making pressure upon the tray, as the soft tissues are apt to overlap the posterior margin of the alveolar border. The patient should then be requested to thrust the tongue out of the mouth as far as possible, so as to free the soft tissues from entanglement. To remove the tray, press the finger of the left hand against the inner surface of the cheek, outward and downward, so as to admit air under the impression.

In middle life, or in old age, where there has been great absorption, the muscles of the mouth are on a line with, or sometimes higher than, the maxillary ridge; the outer edge should then be turned out at a right angle with the body of the tray. If the edges of the tray are too straight, or the two sides are in nearly parallel lines with each other, the outer edge presses the muscles down over the maxillary bone, and when the reverse is taken from it there will be a sharp-ridged cast; and when the plate is made to fit, the edge will cut the muscles, and make a sore mouth. But by using a tray with the outer edge turned out, so as to drive the cheek out, the muscles are drawn on a line where they are connected with the ridge of the jaw, and more in their natural position. When a plate is made, the muscles will have a free play under the edge of the plate, and will not lift it from the jaw and float it around the mouth.

In taking impressions for partial cases, to prevent difficulty in the withdrawal of the impression, the shape and position of the teeth should be carefully noted, and manipulations made accordingly. Before taking the impression, undercuts, etc., should be looked for, which must serve as a guide in the withdrawal of it. Where the teeth are wedge-shaped, or conical, or straight and short, there will be no difficulty ; but where they are long, or inclined, or where the necks are smaller than the crowns, they will not deliver without fracturing the plaster. In some cases a little wax, pressed into interdental spaces, may serve a good purpose by preventing the plaster from entering. The impression should be removed from the mouth, either before the plaster has set so as to make it liable to fracture, or else allowed to remain until it is sufficiently hard to make a clean fracture. There is danger, however, if there are loose teeth in the mouth, of extracting them in the removal of the impression.

In such cases it has been recommended to dry the teeth, and put a cylinder of wax around them ; and, if great care and nicety is observed, this plan will give good results. It has also been suggested to take fibers of raw cotton and place in the tray where the teeth will strike, and run some thin plaster over it in the form of batter. This will prevent the plaster from breaking up into such fine particles as it otherwise might.

Various plans have been recommended for taking impressions of difficult cases. The following embrace all that are thought to be of special importance :

Having taken an impression in wax, a metallic die and counter-die are made, as for ordinary plate-work. From this a plate of brass, tin, or zinc is struck up, to be used as an impression-tray, the palatal surface of which is coated with a thin batter of plaster, and applied to the mouth in the usual manner. Others prefer taking a wax impression, from which all those portions indented by the teeth are subsequently cut away, allowing only so much of the wax surface to remain as corresponds with the artificial base to be supplied. This is subsequently employed as a tray with which to take a plaster impression.

The spaces between converging teeth may be first packed with thick mixed plaster (or with modelling composition or wax), and the sides sloped smoothly, so that when sandaracked and oiled, the subsequent impression will on removal leave the sections in the mouth. They can then be laterally displaced and returned to the impression.

A process for taking plaster impressions for entire superior dentures was suggested by Dr. A. Westcott. Take a wax impression as a preliminary step. When cold, carve with knives curved laterally, and with bent gouges, with great care. After deciding as to the proper form and size of the impression, and in a general way trimming off all the wax which is not needed, make a cut in the wax one-eighth of an inch deep on the inside of the impression, and about one-eighth of an inch from the margin. This cut should follow the entire margin of the wax impression, and across the palatal surface. Now carve out the entire surface of the wax to the depth of from one-eighth to one-quarter of an inch, except a narrow strip, perhaps one-quarter of an inch wide at the extreme front, and at the place of greatest depression in the wax. When this impression is replaced in the mouth, it rests firmly upon the unchanged strip running across the rear end of the palatal arch, and at the same time bears upon the uncarved strip at the front of the impression.

An impression having these resting points can be held steady by pressure bearing upward against the center of the impression-tray long enough for the plaster to set.

There is a liability, in partial cases, that the plaster will break in a number of pieces. To determine in advance the lines of fracture, Dr. A. G. Bennett suggests that the impression-tray be warm and a narrow strip of base wax attached to its floor, dividing the space between the outer rim and the palatal projection ; a like strip running from this to the rear of the tray. The tray is then to be oiled, filled with plaster, and the impression taken. The tray comes away leaving the plaster adhering to the teeth, the wax remaining in the impression, and serving as guides to show where it may be cut. The impression may then be removed, the pieces replaced in the tray and attached with fresh plaster.

Dr. A. Westcott described a plan for taking impressions for partial cases with plaster : Saw off the rim of an ordinary tray with a fine saw, and again couple it with the palatal portion by brass dowels. Take the rim and solder on to it three short pieces of brass wire,—one on the front and one on each side of the rim. Next, solder on three short pieces of brass tubing, corresponding in position and in size of hole with the wire dowels already soldered on to the rim. By this arrangement the rim may be removed and replaced at pleasure.

As it is very desirable to bring away the wax and plaster with the palatal portion of the tray, provision must be made against the cleavage of the wax from the tray. This may be done by holding the tray over a spirit-lamp, and securing an adhesion by melting the wax ; but a much easier way is to perforate the base of the tray. In taking the wax impression preliminary to the plaster impression, the wax will press through these orifices more or less, and by spreading out like the heading of a rivet on the bottom of the tray, make a strong and secure holding when the wax is cold.

These orifices will be found a convenience in any case of plaster impression-taking. When the two parts of the tray are placed together so as to form a tray of the usual form, and the wax impression taken, as above described, then pass a thin blade through the seam or joining, and separate the wax so that both rim and wax may be easily taken from the lower or palatal portion of the tray. Separating the two parts on this line leaves all, both plaster and wax, within the rim in the mouth, while the palatal portion is removed. To remove the portion embraced within the rim easily, and without unnecessary crumbling, spring off first one end of the rim and then the other, and remove the rim from the mouth. Then, by a thin, though not sharp, knife, or firm spatula, divide the plaster, which is still in the mouth and outside the teeth, into three sections, which may generally be removed without breaking it elsewhere, and in a way that the pieces may be readily returned to their proper places. There may be *cut-offs* of wax placed where it is desired the plaster should separate, so that the sections may be very easily removed. These cut-offs consist simply of thin plates of wax set up edgewise, so as to divide the plaster while thin into any number of sections, and reach from the rim of the tray to the teeth or gum.

In taking an impression where there are teeth and spaces of naked gum between them, and especially where the teeth are bell-crowned, it is well to set up thin slips of wax from tooth to tooth, or else leave such cut-offs, when curving the wax, to make room for the plaster. In taking impressions for partial sets, there is not the same necessity for providing against the rocking of the impression-tray, as the depressions made by the teeth in the wax are not obliterated by the curving, and these will serve as the steadying-points when the wax is returned with the plaster for the final impression. By carrying out these suggestions, there is no more difficulty in getting a perfect impression of *every part* in mixed cases than pertains to full sets where the gums are entirely naked.

Dr. S. E. Gilbert suggested the following method of taking a partial upper impression : Place enough plaster against the palatal surface of the tray to fill the mouth even with the masticating surfaces of the teeth, adding a little plaster around the inside of the rim ; a rim of wax having previously been built across the palatal edge of the tray.

Dr. W. N. Chaffee suggested this plan of taking a perfect impression in plaster for a partial set, when the remaining teeth are long, and have large crowns, small necks, and incline toward one another :

Select an impression-tray of suitable dimensions, preferably with a square turned rim, instead of an oval one, as it accommodates the teeth much better. Prepare the tray by bridging across the back edge with a thin strip of wax not thicker than a knife-blade, to prevent the plaster from dropping over into the throat.

Then soften some wax in warm water, making it as soft as possible without melting, and roll it out into a stick as large as the little finger, and long enough to pass around on the inside of the border of the tray, from heel to heel. Heat the tray over a spirit-lamp sufficiently to attach the wax to it, and lay the wax in around the border. The principal point to be observed in this method is expedition. After placing the wax in the tray, the plaster, mixed with warm water, in order not to chill the wax, should be placed in the tray, and introduced into the mouth as quickly as possible, while the wax is in a plastic condition.

The wax takes the impression of the teeth very kindly, and the plaster gives a perfect impression of the whole palatal surface.

Dr. B. W. Franklin devised a tray for taking impressions of the inferior ridge. This tray, or rather double tray, has an opening all the way round, except a narrow bridge at the front. The advantages of the opening are that when the under part of the tray is filled, and the upper part one-fourth full of plaster, and placed in position over the ridge, the operator with the end of the finger can force the plaster into the under tray and secure a perfect impression.

For difficult partial cases Dr. A. G. Bennett suggested the selection of artificial teeth, which are to be ground to fit in the spaces, and secured in place with hard wax. The impression is then to be taken, and, after removal, the teeth are placed in position. This method requires no articulation out of the mouth.

Dr. Charles J. Essig suggested for obtaining impressions of difficult partial cases the following plan : but it is not applicable where interdental spaces are frequent or large.

An impression-tray should first be selected of the proper size and shape, —those with the flat floor are best for partial cases ; the plaster should be mixed thin, almost as thin as water, adding sodium chlorid to facilitate setting. Now oil the tray, so that it will readily separate from the impression when hard ; fill the tray as soon as the plaster thickens sufficiently ; then, with a small spatula, place a layer of the soft plaster in upon the palatal surface ; otherwise by inclosing the air in the deep portion of the arch the accuracy of the impression may be impaired. After this precaution the tray is placed in the mouth, and gently pressed up until its floor comes into contact with the teeth. When the plaster is sufficiently hardened, remove the tray —which, from its having been oiled, is done without difficulty. With the thumb and index finger break off the outside walls. The portion covering the palatal surface is then removed by the use of a blunt steel spatula, curved at the end in the form of a hook. The pieces are then placed back into the tray, where they will be found to articulate with perfect accuracy.

For taking a partial lower impression, where the teeth are elongated or loose, or lean in different directions, Dr. S. E. Gilbert advises to first obtain an impression in wax and make a plaster model ; then fit wax caps over the crowns of the plaster teeth, extending almost to the gums. These wax caps are to be removed from the model, and placed upon the natural teeth, and an impression taken in plaster as usual.

The late Dr. James B. Bean, of Baltimore, recommended that a wax impression should be taken, from which dies must be prepared ; a metallic plate swaged, on which from ridge to ridge a strip of metal should be soldered. Between this and the plate he passed a stick, to serve as a handle in removing the impression. Then, after heating the plate, he coated the palatal surface with shellac, and upon this placed a thin layer of raw cotton, which, adhering to the resin, and permeating the plaster batter, when poured on, prevented the thin impression from breaking up into fragments.

Prof. P. H. Austen designed a gutta-percha tray which is thus described : Take a wax impression and make a model ; in partial cases, brush over the teeth of the model one or two layers of thin plaster, to fill up all undercuts, and to make the plate fit loosely ; saturate the model with water, and mold over it a gutta-percha tray. This last is done, not by using the gutta-percha in sheet, but by first making into a ball, then working it from the palate outward, leaving a thick mass in the center. It should be, on the inside, from one-fourth to one-half of an inch thick, so as to be stiff and unyielding ; but on the outside not more than one-eighth or one-sixteenth inch thick, so as to be slightly elastic and yielding. The whole inside of the tray must be roughened up with a scaler or excavator, in such a way that the plaster can take firm hold. In most partial cases, the impression will have to be removed in sections ; the inside remaining entire, but the outside and the parts between the teeth coming away separately. In certain cases, it is necessary to partially cut through the tray before putting in the plaster, and usually upon the thick masses of gum which fill the interdental spaces. A cut on the inside, in line with the ridge, gives pliancy to an otherwise rigid tray, and permits its easy removal. When it is desirable to extend the tray around the entire arch, so as to get an exact plaster impression, not only of the gum but of all the remaining teeth, this rim of gutta-percha must be slit at two or three points, to give that pliancy which is a chief merit in this form of tray. These trays have no handle, but are removed by inserting a plugging instrument into a small hole previously made in the back part of the tray where it is thickest.

Dr. Horace Dean describes a method of taking an impression of a partial upper case substantially as follows :

Take a correct wax impression. In this cast a plaster model. Separate as soon as set. On the model place sheet wax to cover all the portions of which a copy is desired, including the palatal surface, but not the grinding-surfaces, of the teeth. In the spaces between the teeth let the wax be quite thick. Over this wax plate carefully adapt a piece of wire mosquito-netting so that it touches the wax and the grinding-surfaces of the teeth. Coat with glycerol the parts of the model not covered with the wax. Pour a coat of plaster over the wax and net, covering the grinding-surfaces of the teeth and a narrow space behind the wax plate. When hard, separate and remove the wax. Try the shell in the mouth, and trim so that it goes easily into place and rests firmly on the ends of the teeth. Soak this shell in water, and fill with plaster mixed as usual. Place in the mouth, and press until it rests on the teeth.

For a full upper case take the impression in wax, and make a model. Mark on the model places where the shell can rest firmly. Construct the shell as before described, and take the plaster impression.

For a partial lower case proceed as before, except leaving a portion of the wire net, just back of the front teeth, uncovered by plaster. This forms a hinge which permits the free ends of the shell to be pressed toward the tongue, thus carrying the plaster past the teeth until the shell is in place. The wings may then be pressed against the teeth and so held until the plaster has set, when, if necessary, the wings may again be pressed inward, breaking the impression at the hinge with a clean fracture, which serves as a guide to correct restoration.

A method recommended by Dr. S. H. Guilford is to place pieces of wax on the tray at points corresponding to the natural teeth remaining in the mouth ; then, keeping the wax warm and plastic, fill the remainder of the tray with plaster.

Dr. J. F. Leaming proposed a method of taking upper impressions with plaster without a tray :

After carefully examining the mouth, mix a sufficient quantity of plaster to the consistence requisite to pour into a mold, adding a little salt, if necessary, and stirring constantly, until it gives evidence of setting. Care should be taken not to delay too long, as better results are obtained while the plaster is quite thin. Distending the mouth slightly with the left hand, introduce the plaster quickly, but not hurriedly, upon the point of the spatula, first covering the arch until overfull, then upon the buccal aspect of the gum, beginning posteriorly on both sides, and finishing anteriorly, pressing the plaster carefully to the gum, in front, with a napkin. Remove, by first pressing the impression at the sides carefully downward. If any portion of the rim is imperfect, trim down as far as needful, wet the impression, reapply it to the mouth, and build up with fresh plaster.

For a full case, where the gum in front is soft and flabby, it has been recommended to use soft wax for a first impression, making the wax adhere to the tray; when cold, cutting a deep groove, into which the softer portion of the gum can depend, leaving the waxed ridge quite high all around, and if the roof is hard, having the wax sufficiently high at that point to press it gently. The plaster should be as stiff as can be used without pressing the soft tissues out of place.

Dr. F. C. Green, for a full lower impression, recommends a very narrow tray,—one not much wider than the alveolar ridge; the tray to be filled with quick-setting soft plaster. After removing the tray from the mouth, the edges are to be trimmed, and a thin layer scraped from the entire surface, especially under the tongue. The impression is then to be thoroughly soaked in water, filled with plaster not thicker than cream, and replaced in the mouth with gentle pressure, care being taken that the tongue is raised and that the muscles are not impinged upon.

Dr. C. S. Chittenden recommended the following plan for making a tray for special cases: First take an impression in wax and draw a cast from it; then take a piece of sheet lead and fit it to the cast as nearly as possible, by rubbing down with burnishers, something like a trial plate, leaving it a little higher on the edges than a plate which is to be worn would bear to be. Use this lead pattern or trial plate for an impression-tray; but as it would not be stiff enough to answer that purpose of itself, punch some small holes through the lead, and pour plaster of Paris over the whole lingual surface, letting it run through the small holes in the lead, so as to bind the plaster firmly to it in the same way that mortar is bound to the lath on walls and ceilings. When the plaster has set, cut away all that will be in the way, and having prepared the plaster for the impression, pour it into this made-up tray, and, putting it into the mouth, press it home in the usual way.

For partial cases where the remaining teeth incline inward, Dr. Stewart J. Spence cuts from the selected tray its buccal flanges as far forward as the cuspid portions, and slits the vault part nearly to the labial flange, so that the two wings can be readily conformed to the width of the arch and to the depth of the vault. Pulverized potash-alum is added to the plaster, which is mixed moderately thick and piled on the vault part of the tray, extending to its front flange · The fingers can be used to press the plaster with the tray into the vault, while the protruding plaster is all scraped from the buccal cusps and surfaces of the bicuspids and molars. When the plaster has been given time to become very hard, it is cut from the grinding-surfaces of the bicuspids and molars so that these may, by the index finger wrapped with thick rubber-dam, be successively forced outward and so loosened from the plaster that it may be readily removed with the tray.

Dr. George F. Reese suggests the following method for special cases:

Cut a hole through the floor of the tray, and over this place sheet wax, and with the same material make a shallow cup or reservoir on it; on the flange and across the palatal edge of the tray form a rim of wax. After the introduction of the tray, the plaster in the reservoir can be manipulated with the finger, forcing it up into the arch.

For partial sets, melt wax over the tray. Add softened wax to take an accurate impression. Cool this in water and cut away the wax wherever the plaster is specially desired to go; rim the cavities with sheet wax to form reservoirs. After trial in the mouth, fill in with plaster, taking care to have the reservoirs full, but no plaster in the impressions made in the wax by the teeth.

It is sometimes advisable to take a preliminary impression in modelling composition, cut a groove across the palatal part of the impression, and from the groove raise a wall of soft modelling clay. Then gloss the surface of the compound over the spirit-lamp flame, spread an even coating of soft mixed plaster, and take the impression as usual. The soft clay will not disturb the palate, yet will perfectly prevent the passage past it of the plaster.

Dr. W. S. Payson suggests the following method of making an extension to an impression-tray:

Take a strip of thin sheet lead or tin and shape it to fit the rear floor and come around on the sides of the tray, flaring backward and standing as high as desired. Drill holes through the strip and tray, and sew them together. The plaster will thus be prevented from overflow into the fauces. By simply cutting the threads the tray may be restored to its original form, and be ready for another like modification to meet any peculiar case.

Dr. B. F. Rosson suggested the following plan of taking impressions:

The principle consists in obtaining an impression only of the parts upon which the plate is to rest; this is done by using for the lower jaw a very narrow impression-tray, and almost flat instead of deeply concave, as they usually are. This may be bent so as to partake as nearly as possible the form of the ridge of the jaw. A sheet of softened wax is then put upon the tray, and pressed upon the jaw till a good impression is secured; then trim down the wax just to the size the plate is to be; now use this for the plaster impression-tray; a very small portion of plaster properly prepared will be sufficient to obtain a very perfect impression. The plaster should at no point be permitted to pass much beyond the proposed border of the plate; this is to prevent pressing and distending the soft tissues on both sides of the ridges; such distention usually draws the mucous membrane of the gum out of position. Immediately after the tray with the plaster is placed on the jaw, the tongue should be raised above the tray and kept there till the plaster has set.

The tray for the upper jaw should not extend much beyond the ridge all round, so that the same principle is observed as described for the lower.

Dr. L. E. Custer adopts the following method in taking an impression of a difficult upper partial case:

With a spatula bent the required shape, carry plaster of Paris of proper consistence to the roof of the mouth, and spread it as far back as necessary, adding more plaster until even with the necks of the teeth, leaving the exposed surface rough. Then with modelling composition take an impression over the hardened plaster, to which the composition will adhere, thus securing the advantages of both materials,—the plaster for the mucous membrane and the composition for the teeth.

The following method of obtaining an impression for a difficult partial lower case has been recommended :

The mouth offered serious obstacles to the procurement of a correct impression,—a broad jaw associated with a contracted oral opening ; a cuspid and a molar, upon either side, which, inclining toward each other, inclosed interdental spaces of dovetailed form ; the teeth of that bulbous configuration consequent upon an extensive absorption of the supporting structures. All of the customary plans for obtaining a cast were employed without success, but a satisfactory model was finally secured by the following process :

An impression in wax was first taken, from which the plaster cast was made, and the teeth removed as usual ; but before imbedding in the sand the entire surface was evenly covered with sheet wax one-eighth or one-fourth of an inch in thickness. When the metallic models were made, a plate of ordinary tin or tinned iron was struck for an impression-tray ; perforated to permit the teeth to pass through, and a handle soldered to stiffen the appliance and facilitate its introduction into and withdrawal from the mouth. The tray so constructed was adjusted to freely slide over the remaining teeth, its interior *thoroughly oiled*, and small pieces of wax placed over the apertures to prevent the batter from escaping while inverted. Thus filled, it was placed in position (the teeth readily displacing the loosely applied wax over the openings), and allowed to remain until the plaster had sufficiently solidified, when it was removed, leaving the hardened plaster to be carefully extracted in sections and replaced in proper position in the tray.

The success of this method will be largely, if not wholly, dependent upon the use of a *stiff* and *unyielding* cup, which shall not bend or spring from the application of the requisite force.

For a full impression in which a metal die is to be cast, mix one-third of either fine sand, marble-dust, whiting, or pulverized quartz, with two-thirds plaster. Slowly and thoroughly dry the impression, and pour the metal at its lowest melting point. This plaster compound is also useful in difficult cases where an impression should be allowed to get quite hard prior to removal in easily broken sections.

The model should be taken before the plaster impression becomes dry, having previously coated it with something to prevent the adhesion of the plaster,—a solution of soap, a thin wash of collodion, or sandarac or shellac varnish. The solution of soap is made by adding an ounce of white Castile soap in powder or shavings to a pint of water, and heating it until the soap is dissolved. It should then be bottled, and poured out as needed for use, avoiding using it from the bottle, as it is rendered turbid by contact with a brush that has been used on plaster. Soap is best on a very moist impression ; collodion or varnish on one partly dried. If the impression has become very dry, it is necessary to saturate it with water before pouring the plaster for the model. If varnish is used, oiling the surface after it becomes dry will insure the separation. The latter plan of varnishing the impression with an alcoholic solution of sandarac or shellac is strongly advocated, as the coloring matter by penetrating a short distance affords a guide in separating the model, and thus diminishes the liability to fracture or mutilate the cast,—an accident often occurring where there is no line of demarkation, and one is obliged to rely upon his mental outline of the case. The water with which the plaster is mixed for taking an impression is sometimes colored for the same purpose by the use of a few drops of a solution of carmine or anilin, or by the addition to the dry plaster of a small quantity of Venetian red, Spanish brown, burnt umber, cochineal, indigo, washing-blue, or vermilion. Enough of either to answer the purpose is not detrimental to the plaster, and gives it an appearance pleasant to the eye of the patient.

A NEW INSTRUMENT FOR OPENING THE SKULL IN BRAIN-SURGERY.

BY M. H. CRYER, M.D., D.D.S., PHILADELPHIA, PA.

In the DENTAL COSMOS for September, 1893, I described in a paper read before the World's Columbian Dental Congress an improved surgical engine, tracing the development of the instrument from the ordinary dental engine, through the surgical engine of Bonwill and that of The S. S. White Company, up to the form described as at that time perfected. The new surgical engine was exhibited for the first time at the clinics of the World's Columbian Dental Congress, and demonstrations were there made showing its range of applicability in bone-surgery, especially to that of the head.

For making fenestra in the brain-case to furnish access to the brain in operations for the removal of clots, tumors, etc., or for internal nerve-resections, the superiority of the circular saw, run at high speed by the surgical engine, over the usual method by chisel and mallet was abundantly demonstrated. Since that time an extensive operation upon the living subject has been successfully performed, in which the Gasserian ganglion was removed by Professor W. W. Keen, the initial section of the brain-case being made by the writer with a small circular saw driven by the engine. This case, as well as a series of carefully conducted experiments upon the cadaver, shows that all danger of wounding the dura mater is not absolutely eliminated, even by the use of the guard which is attached to the mandrel of the saw to prevent the entrance of its cutting-edge beyond a definite previously determined depth. This danger exists in the fact that brain-cases of various thicknesses are met with by the operator, and, further, individual skulls vary greatly in thickness at different points. It therefore becomes impossible to set the saw-guard to any previously determined depth which will insure complete section of a given territory of the brain-case, and at the same time in every instance absolutely avoid wounding the dura mater.

To accomplish complete section of the bony structure, and avoid wounding the meninges in the slightest degree, is absolutely essential. A highly educated sense of touch and greatest manipulative skill are not sufficient safeguards against the possibility of such an accident in these operations, where a mistake of this character might result fatally. The use of chisel and mallet for completing the bone-section is open to the objection of adding materially to the shock of operation, nor is it free from the possibility of puncturing the dura as well. So crude a method as the use of chisel and mallet in these delicate procedures savors of barbarism, and such instruments should be banished from the equipment of the surgeon. The great advantages of the saw are the rapidity with which it cuts, so that the section can be made in a few moments, and also its freedom from the percussive effect which is a necessary accompaniment of the chisel-and-mallet procedure.

A considerable number of experiments have been carried out by the writer, with the hope of overcoming the main objection to the use of the circular saw already stated. The greatest promise of success seemed to lie in a properly constructed side-cutting bur, similar to the ordinary fissure bur of the dental engine, but of proper dimensions and cutting effectiveness for use in the surgical engine for this especial purpose. Burs of several sizes, and with variations in the shape and arrangement of the cutting-blades, were tried, but were found to have the vital defects of slow cutting and clogging of the bur-teeth with *débris*, rendering them useless in a very few moments. After many trials of a number of variously constructed burs, the following arrangement was hit upon, which completely fulfills the requirements. The cutting portion of the typical bur (Fig. 1) is one-half inch in length, one-eighth inch diameter, slightly tapering from base to point. By three spiral grooves, each having a turn of one hundred and twenty degrees through the half-inch from base to point of the cutting end, it is divided into three blades, giving it an appearance somewhat similar to a twist-drill. The effectiveness of these blades is enormously increased by a spiral screw, forty-two threads to the inch, cut around the blades of the instrument. This device necessarily adds twenty-one teeth to the edge of each cutting blade. The individual teeth are so arranged with reference to one another that the cut made by one tooth is overlapped by that of the one next following, while the spiral arrangement of these teeth, in connection with the three spiral grooves, makes the bur perfectly self-cleaning, the *débris* being rapidly thrown out backward by the revolution of the instrument. The point of the bur (A) when in use is guarded by a rounded, button-like attachment, connected with the nose of the hand-piece by means of a shank and collar, as shown in Fig. 2 at B. The free end of the bur is doweled into a seat in the guard B, in which it revolves, which steadies the whole arrangement when in use, gives

FIG. 1.

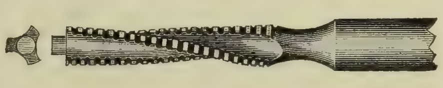
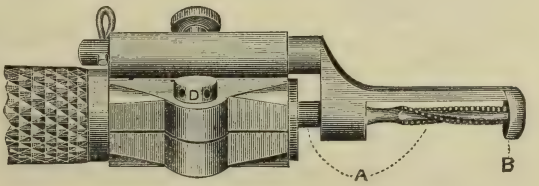


FIG. 2.



an added rigidity to the bur-shank, and holds the bur and guard in permanent relationship to each other. The detailed description here given is of what I have called the typical bur for the special operation under consideration. Other instruments, simple modifications of this, would of course be needed, and could be easily made for other operations upon bone. A similar instrument, with or without the guard, could be used for resection of the long bones, of the femur, for example, in any part of its length, even at the head while in the acetabulum. To remove diseased or nodulated bones of the nasal cavities, the same sized instruments, with longer shaft and without the guard, could be made. Drills upon this fundamental type can also be made by lengthening and tapering the three spiral blades to a point, and large burs of various shapes by increasing the number of spiral, toothed blades in definite relation to the size of the cutting instrument required. It will be seen that the principle involved in the instruments described is simply that of a saw arranged to cut in a line with the axis of the shaft of the bur, and not at right angles to it, as in the circular saw. Such an arrangement allows of cutting in any direction, and upon curved lines. This feature is especially valuable in resections of the brain-case, inasmuch as fenestra of any desired shape or size may be speedily made, while those by the circular saw are somewhat limited as to size and shape.

In operating for the removal of a portion of the brain-case with the spiral bur, after division of the soft tissues by the scalpel, a small opening is first made with a trephine mounted in the engine hand-piece ; this trephine has a diameter of five-sixteenths of an inch, and is passed completely through both tables of the skull, and the button of bone removed.

There is no danger of injuring the dura with the trephine if it be carefully used. The opening thus made affords a means of entrance for the cutting bur, which is next, with its protecting guard, inserted in the opening, and the section made along the lines previously determined, by running the engine at high speed and forcing the bit laterally in the direction desired.

The button-like guard at the point of the bur absolutely prevents injury to the dura, which is pressed or dissected away by it from its attachment in the line of the cut as the instrument progresses.

The relative rapidity of the cutting process is somewhat less as compared with that when the circular saw is employed, but the entire freedom from danger to the dura mater more than counterbalances this, while the rapidity is amply sufficient.

In my previous article I made the following statement respecting the surgical engine :

''As yet it has not been much employed for operations in brain-surgery, but it is to be assumed that the time is not far distant when it will be universally used whenever the brain-case is to be opened.''

The instrument here described is an added reason for my faith in the practical utility of the improved surgical engine in this important branch of surgery.

CORRESPONDENCE.

NORMAL DEVELOPMENT OF THE JAWS.

TO THE EDITOR OF THE DENTAL COSMOS :

Sir,—On page 1222 of the November COSMOS occurs the following passage in my paper on "Principles Underlying Regulating" :

"The first one to be borne in mind is that the child continues to grow up to eighteen years of age, *or later*, according to the age at which the third molars erupt. Eighteen is mentioned because that is the age at which the third molars generally appear ; and yet several cases have lately come to my knowledge in which practitioners have advised the removal of the retaining fixture which maintained an expanded arch before even the cuspids were fully erupted, thus losing all that had been gained by months of previous effort."

The effort is here made to show that a child does *not* cease growing at thirteen, or even "at eighteen or later."

Dr. Talbot, in his discussion, states a number of interesting things, but curiously enough says, "In regard to the teeth standing inward, ... this is because, while the lower jaw is developed normally, the development of the upper jaw was retarded by some cause, and the teeth as they came through were crowded out of line."

If Dr. Talbot here speaks of upper teeth, he is mistaken, because two of the lower jaws are *not* developed normally, and in the third the upper teeth are *not* crowded out of line.

If he speaks of lower molars, he should have noticed that all lower molars, developed normally, incline inward.

In the next paragraph he states that "it is not true, as the paper says, that a man's growth is completed by the eighteenth year."

The paper does not say so, but the contrary.

Just such inaccuracies as these often mar the work of some of our most earnest investigators, and diminish the value of their conclusions.

E. A. BOGUE.

NEW YORK, December 15, 1893.

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TRANSLATIONS.

THE USE OF THYMOL IN PULPITIS.

BY DR. C. RÖSE, FREIBURG I. B.

(Translated by WILLIAM LOMBARDINO, D.M.D., Berlin, Germany, from the *Journal für Zahnheilkunde*, No. 35, 1893.)

IN the first and fourth numbers of the *Deutschen Monatsschrift für Zahnheilkunde*, 1892, Hartmann published the use of thymol in powder and crystalline form in cases of pulpitis, instead of the customary cauterization with arsenic. The author is convinced that through the suggested treatment the pulp is restored and not destroyed, as is the case with arsenic. Immediately after Hartmann's first publication, I made several experiments with thymol in private practice, as well as in the polyclinic, and arrived at the conclusion that this material is a very valuable addition to dental medicaments.

In most cases of acute and subacute pulpitis an alleviation of pain soon occurred after having sprinkled pulverized crystallized thymol upon the exposed, but not bleeding, pulp-surface.

At the second sitting, Fletcher's cement was used for capping, and in some cases a little pulverized thymol was worked in with the filling. All cases treated in this manner, with the exception of one, remained entirely free from pain. In a few cases it was not possible to mitigate the acute painful attacks of pulpitis, and arsenic paste had to be resorted to. The question as to how thymol acted was of extraordinary interest to me.

At first it was intended to solve the question through practical experiments upon animals; but such exact researches are only of practical value when they can be practiced and controlled upon human beings. It is not easy to obtain suitable material for experiments, and I have at present only been able to examine one case, which was strictly observed, the condition of which is valuable enough to be communicated for the present. A clinical patient, aged twenty-three years, had extreme pain about the left second inferior molar; a large carious cavity was found on the buccal surface, extending somewhat below the gum, and upon thorough examination the acutely inflamed pulp, highly congested and swollen, was found to be exposed; it was treated with thymol and filled with cement. In the first week a slight tension was noticeable now and then, and from the fifth week on the same disappeared, and there was no reaction whatever. After a period of eight weeks, the patient was persuaded to have the tooth extracted in a narcosis. The operation could be performed without dental malpractice, as the antagonists were wanting and an artificial set was to be inserted. After fixation with sublimate, and hardening in alcohol, the pulp was isolated through careful splitting of the tooth, colored with alum carmine, imbedded in paraffin, and cut into series of five to ten micro-thicknesses. The result was as follows:

From the pulp-surface treated with thymol down to about one-third part of the crown-pulp, as well as along the vessels, a central top of the one root-pulp was infiltrated with pus. The pulp of the other root, as well as the larger part of the crown-pulp, showed throughout no change of any kind in structure as compared to a normal pulp. The tissue infiltrated with pus was separated from the normal by a very sharp line, while in the deeper parts of the pus-herd the picture of the real acute pus-infiltration, covered with numberless partly single, partly double, germ leucocytes, between which, here and there, only a long nucleus of fixed connective tissue was visible, and very large typical phagocytes, all containing more or less leucocytes or *débris* of their cell-bodies, appeared on the surface. Some of these phagocytes also contained red corpuscles, and as many as ten in one cell.

Phagocytes are extraordinarily large single germ-cells which emanate from the fixed cells of the connective tissue infiltrated with pus. They possess the faculty of taking up and digesting the multigerms, which are no longer capable of regenerating pus-bodies. The more the suppuration abates, the more frequent, through indirect germ-division, are the phagocytes. Their previously rounded cell-body receives feelers, germ and cell get smaller,—spindle-shaped; in short, we have the typical granulation-tissue before us, which originates from the fixed connective-tissue cells and their offspring, the phagocytes, which was definitely settled by Ziegler, Marchand, and their pupils some years ago.

The examined pulp now presented an extraordinarily favorable object for observing the gradual transformation from a pure purulent infiltration to a fresh cicatrix-tissue. In the neighborhood of the surface, there, where the suppuration should, as proved, be observed earlier through the chemical irritation of the thymol, were found phagocytes (some irregular, some in regular order) of large spindle-form, and some partly infiltrated with pigment.

The pigment originates from the *dêbris* of the red corpuscles, and keeps itself in other granulation-tissue, often very long in the phagocytes. In the extreme layer (or lamina) the same were provided with long arms or feelers which clung to the tooth-structure. At the places where the normal pulp-tissue commenced a sharp line was apparent, and it was easily proven that the young granulation-tissue was not the remains of the old pulp-tissue, as the nuclei of the latter were only one-half to one-third as large as those of the spindle-formed granulation-cells. From the entire result it is evident that the thymol in the above-mentioned pulp produced a partial aseptic suppuration, which was already in the act of healing through granulation process.

In which manner the process would have continued its course it is with certainty impossible to state. In all probability there originates later, as well as in other parts of the granulation-tissue, dense cicatrix-tissue.

In its vicinity the tooth-structure would naturally be without vital qualities; the process of resorption, with eventually a formation of new bone-like material, should not be excluded, since a very large part of the pulp existed entirely unchanged; therefore a tooth successfully treated with thymol may actually, upon the whole, in contrast to one treated with arsenic paste, be considered in structure as at least partly restored.

PROCEEDINGS OF DENTAL SOCIETIES.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting, Tuesday evening, November 14, 1893, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. William Carr, in the chair.

Dr. John H. Meyer, chairman of the Clinic Committee, presented the following

CLINIC REPORT.

A clinic was held this afternoon in The S. S. White Dental Manufacturing Company's up-town depot, in the Harvard building, Sixth avenue, corner of Forty-second street, at which there were over three hundred dentists in attendance.

Dr. R. C. Brewster, of Brooklyn, N. Y., presented two patients having syphilitic lesions in the oral cavity. The first case was that of a young man in the secondary stage, who had a mucous patch on the inner side of the lip, at a point below the neck of the right inferior cuspid. This case was of special interest, as it emphasized the importance of antiseptic precautions wherever any sore spots are observed in the mouth, as but for the fact that the characteristic syphilitic rash appeared on the subject's body, the mucous patch might have been readily mistaken for an ordinary canker. The second case was one in the tertiary stage, showing three prominent gumma on the tongue.

Dr. Frank A. Katzmeier, of the New York College of Dentistry, showed some interesting cases, and reduced fractures in two cases with the aid of an instrument devised by Dr. John H. Meyer, whereby a steady pressure was obtained and the parts gradually forced into proper position.

Case 1.—John Holland, age thirty-seven, native of England ; occupation, mason. In attempting to board a moving train, was hurled against a lot of trunks, and while in an unconscious state was carried to St. Joseph's Hospital, Paterson, N. J., where he was treated for a fracture of the inferior maxilla, and supplied with a Kingsley splint, but after fifteen weeks union had not taken place. In the beginning of August he presented himself at the New York College of Dentistry, where he was provided with a compound interdental splint. This did not bring about the desired union, and another splint was constructed, the bite raised, and everything done to get the fracture to unite, but without avail.

Case 2.—A. Wegstein, age thirty-nine, native of Germany ; occupation, laborer. Presented himself at the New York College of Dentistry, August 24, 1893, with a fracture of the inferior maxilla, right side, on line of cuspid, slightly inclining toward the bicuspids, with a decided lesion of the soft parts. A compound interdental splint was inserted.

Case 3.—A. Lamp, age seventeen. Admitted to St. Vincent's Hospital, June 15, 1893, suffering from a multiple compound comminuted fracture, received while looking down an elevator-shaft as the elevator was descending. The cervical portion of his spinal column was also injured. After two weeks of medical treatment, the case was brought to Dr. Katzmeier's attention, who found on examination a mouth filled with pus, and fracture of both maxillæ. The fracture of the superior maxilla extended from the central incisor on right side toward the second bicuspid, and was simply held in place by a few fibrous threads. The left central incisor was broken off, and the remaining portion, which was driven up through the premaxillary bone, was afterward extracted. The inferior maxilla presented three distinct fractures,—one on line of symphysis, one close to the angle on the left side, and the third just beyond the first bicuspid, right side, extending toward the first molar through a mass of broken tissue. A compound interdental splint was made, but discarded on account of poor articulation. A second splint was made and inserted June 29, 1893. The patient was discharged, cured, August 9.

Dr. Daniel E. Morse exhibited and demonstrated the use of his mitering-angle gum-tooth-jointing instrument, and gave the following description of it : "The method consists in removing the gum sections from the model in the relative positions they occupied thereon, and securing them by means of heated paraffin and wax to the mitering instrument. The sides of the separate blocks designed to come in apposition are ground on the sides of a corundum wheel at the same time and at the same angle, and a true joint thus formed, one that touches front and back, leaving no V-shaped space." Dr. Morse also exhibited his improved displacement gauge for measuring rubber and other substances. It is called the "exact displacement gauge," and is so sensitive that the addition of but a few drops of water will be registered.

Dr. E. A. Bryant, Denver, Col., demonstrated his method of removable crown- and bridge-work, and the adjustment of porcelain facings thereon without soldering. In repairing broken porcelains, he drills holes through the backing from the front, and countersinks the palatal portion ; then, with a special instrument, a screw thread is cut upon the pins of the porcelain facing, and the same securely held, when placed in position, by nuts on the countersunk side.

Drs. Stanton and Baker, New York City, made a cap for a molar which articulated perfectly, although the tooth upon which it was placed was not trimmed away on its grinding-surface. After obtaining a plaster model, the tooth to be crowned was cut from it, shellacked, and molded in ordinary molding-sand. Four zinc dies were cast, and a counter-die hammered in lead. The cusp portion was struck up, and the band, formed by burnishing around the tooth, was soldered to it. It was then placed in the mouth, and found to articulate correctly.

Dr. E. C. Moore, Detroit, Mich., exhibited a linen dental apron, easily adjusted by a hook around the neck and a spring wire around the waist. Dr. Moore also showed a screw hub having a hollowed center for the reception of a lathe mandrel, intended for corundum wheels and other lathe appliances.

Dr. Wilcox, of New York City, presented for advice a case of irregularity, occurring in a miss of fourteen years, having a cuspid erupted outside of the arch, and the other teeth correctly occluding. Some of those present advised the spreading of the arch, but the majority of opinion was that it would be best to extract the first bicuspid.

Dr. M. L. Rhein, of New York, demonstrated the use of potassium and sodium (Schreier's preparation) in cleansing root-canals. The patient, a dentist, had a superior second bicuspid in which the pulp had died under a gold filling four years ago. Upon opening into the pulp-cavity, two canals were defined. The cleansing substance was introduced on a delicate bristle a number of times until the canals were thoroughly freed of their contents, and they were then syringed with mercury bichlorid dissolved in hydrogen peroxid, and then dried out. The patient was turned over to Dr. Shields for the filling of the roots. Dr. Nelson T. Shields, of New York, took the case and proceeded as follows : "Enlarged buccal canal of superior left second bicuspid, using Donaldson's nerve-canal cleansers, and filled the root solidly to the apex with gold, using Abbey's non-cohesive gold, and for root-pluggers Donaldson's nerve-extractors with the hooks cut off and the fine end flattened on an oil-stone."

Dr. George Evans, New York City, demonstrated his method of retarding the setting of oxyphosphate by mixing the cement on a bottle filled with ice-water. Also the use of gutta-percha and oxyphosphate combined so as to allow collar crowns with posts to be easily removed by application of heat, which is a great advantage in bridge-work. Dr. Evans also exhibited several styles of ready-made gold crowns for front and back teeth, one form of which was lined on the interior of the grinding-surface and a portion of the sides with very thin platinum foil, which, he contends, will prevent the melting of that portion of the crown in soldering ; and while it does not interfere with the general manipulation of the metal, it is too thin to show if worn down sufficiently to expose it in the mouth.

Dr. C. P. Pitman, Freehold, N. J., exhibited and applied in the mouth of a patient a piece of the new ribbed rubber-dam which he had devised.

Dr. James B. Day, New York, demonstrated a method of making partial plates and repairing rubber cases without waxing or packing. In partial cases, where convenient, he prefers to grind the teeth to the mouth, thus insuring proper occlusion. He places the teeth in position on the model, and secures them there with plaster ; then with a hot spatula he adapts rubber to the model, and smooths it to the form desired. By this method he dispenses with investment, and has to flask the case only for the purpose of vulcanizing.

Dr. C. A. Meeker, Newark, N. J., bleached a right upper central incisor, for a young lady, with a 25 per cent. solution of pyrozone, using repeated blasts of air supplied by a chip-blower. The tooth was badly decayed and discolored, but after the bleaching operation and filling with cement it presented a greatly improved appearance.

Dr. John A. Daly, of Washington, D. C., demonstrated his method of lining rubber plates with gold, having several flasked cases prepared for the purpose. The lining is pure gold of the thickness of No. 50 or 60 foil, is smooth on one side, and rough or crystalline on the other. Dr. Daly described his method as follows :

The plaster model must be a correct one, and its surface free from air-bubbles. The case is proceeded with as usual until it is flasked. Where the teeth, or any of them, rest on the gums, they should be invested to remain in the lower part of the flask. *All air-chambers should be made of plaster and free from sharp edges and corners.*

1. Separate the flask ; remove wax, etc., preparatory to packing.
2. Varnish the model with sandarac varnish, and allow to dry.
3. Apply a coating of *dammar* varnish, and wait until it becomes very sticky.
4. Cut the gold lining in pieces to suit, and apply it as you would a postage stamp, allowing each piece of lining to slightly overlap the edge of the other.
5. The brown surface of the lining must be kept perfectly clear of varnish, or it will prevent union.
6. Pack with small pieces of rubber.

The flask being separated and the wax removed, cut plenty of vents for the surplus rubber to escape, then cover the model with gold lining (the bright side being next the model). Cut into pieces of such shape and size as to avoid creases and wrinkles. If an air-chamber is used, *that* should be covered first, extending about a sixteenth of an inch beyond its margin all around ; then lay a strip along the back part of the model, cover the alveolar ridge, extending the lining slightly beyond the edge of the plate, and, finally, the remaining space, and press with some soft substance into all the inequalities. Each piece should slightly overlap the adjoining one. Where there is a depression, the lining should be pressed with a suitably shaped piece of rubber eraser or the finger to the lowest point first, and then fasten. Instruments should never come in contact with the brown side, as they damage the crystals. Where the teeth rest on the gums, pieces of lining can be slipped under the teeth.

Pack in the rubber carefully and exactly, close the flask, and vulcanize. In closing the flask, be careful to bring the two parts together slowly and evenly. After vulcanizing, remove the laps with a burnisher or other blunt instrument in the direction which they run, finish with burnisher and soft brush with a little Spanish whiting.

In repairing broken plates, if any of the lining is cut away, replace it before packing with fresh lining ; if none is cut away, nothing need be done.

Dr. Daly claims for this method :

1. The cleanest and best plate for general use ever made, as there is practically a gold and rubber plate combined.

2. This lining cannot intentionally be scaled or peeled from the plate, without the application of such heat or chemical action as would totally destroy the denture.

3. This bright, smooth lining of gold is an added and substantial element of value, sufficient in itself to warrant the moderate addition to the cost of the plate.

4. The rubber attains a higher density, and is capable of a specially attractive polish from being vulcanized on so firm a base.

5. The plate is a more accurate copy of the model than when vulcanizing occurs directly upon a plaster surface, and the fit of plate to mouth is practically perfect.

6. Cultivation of disease-germs or microbes, poisonous secretions of effete or decaying matter, deep-seated uncleanness, and malefic odors in and from the plate are reduced to a minimum.

The display made by The S. S. White Dental Manufacturing Co. was both attractive and beneficial to those who were fortunate enough to be present at the clinic. The company presented a full line of their electrical appliances for use in the dental office and laboratory. Their latest development in this line was a motor stand, in which the motor, the resistance, and the clutch were all embodied in a movable stand, and connected therewith by a heavy cable. In connection with this was a unique design of pedal, carrying two double switches for starting, stopping, and reversing the movement. On the top of the pedal was a speed-regulating device. This apparatus was very justly pronounced a "multum in parvo," as all of its movements, controlled by the foot, were embodied in such a small space and convenient manner. It certainly marks a stride forward in the use of electricity as applied to dentistry.

This company also showed for the first time in public a mechanical device for demonstrating the penetrating and lasting qualities of their "Revelation" burs, and effectually proved that they would turn from a piece of tempered steel a spiral shaving about the thickness of a human hair, and from two to three inches long, whilst no other make of bur would even start a spiral shaving.

A full line of teeth, representing the many hundreds of molds made by the company, were also displayed in very attractive form, as they were apparently mounted on velvet, no wax being visible.

The Clinic Committee were informed that these handsome trays of teeth were designed for the Columbian Exposition, but were not sent there because of their inability to secure the space the company had applied for.

Dr. Northrop. I move that the thanks of the society be extended to all the gentlemen who responded at the clinic this afternoon, and also to the committee. Carried unanimously.

The president introduced Prof. Thomas Fillebrown, of the Dental Department of Harvard University, who read a paper on the subject of "Hypnotic Suggestion as a Sedative and Obtundent."

(This paper appeared in the DENTAL COSMOS, September, 1893.)

Dr. Fillebrown. That we may more fully appreciate the progress which hypnotic suggestion has made, I will refer to its history. In a paper presented to the British Medical Association upon this subject, the association refused it even a hearing, and substituted in that section a paper on the "Spalpi of Spiders." Two years after that, a paper on the same subject was presented. This was accepted, and the section before which it was read was filled to overflowing, while all the other sections were almost totally deserted. During the present year, the *British Medical Journal*, which had previously refused to the subject any credit at all, came out with the statement that "hypnotism has come to stay; it is worthy the attention of every thoughtful man." A few years ago it came to this country almost unknown,—I mean in the modern understanding of it; and no longer than a year ago last summer there was a paper ready to be presented to the American Dental Association on the subject. It had been well studied, and read once in part in a little New England village. Under an almost obsolete rule it was refused a hearing. This year, at the World's Dental Congress, a paper upon that subject was the one paper chosen from America to be read before the general session of the World's Columbian Dental Congress, as most likely to interest the largest number of persons; although it was the last paper, the close attention paid to it shows that it was not altogether misjudged; and the number that appear here to-night, and the interest I already see on your faces, also show me that it will prove an interesting subject to you. I prophesy that in a few years every man who practices dentistry scientifically will have his practice controlled by the principle of hypnotic suggestion.

Discussion.

Dr. Carl Heitzmann. Mr. President, I am not guilty of having hypnotized any one except my canary bird, and that is done very easily. It is a nice bird, and I hold it in my hand, put my finger on its forehead between the eyes, and in half a minute I can do anything with it.

This hypnotism is a wonderful thing, and has been used and misused for thousands of years. Of all explanations that I have heard or read about the philosophy of hypnotism, one has struck me forcibly as being the best, and that is the explanation of Professor Heidenhain, of Breslau, Germany. What the essayist told us is largely metaphysical; the ego and the automatism of the brain, I must say, I do not like much. It only explains one puzzle with another. Heidenhain says it is the exclusion of the large brain from activity. Since the wonderful discoveries of Meynert, of Vienna, we know we have in our brains three successive centers of gray matter. Heidenhain claims that the largest and most extended center of the cortex is made useless in hypnotism; that is, everything we call will, energy, observation, is cast off, and a hypnotized person becomes an automaton, because only the deeper centers come into play, much the same as in hysteria, to which hypnotism is closely allied. There is a good deal of probability in this explanation; but how it is done nobody can tell. It is a puzzle indeed. This much seems to be certain,—that the more the nervous system is weakened by sleeplessness, suffering, sorrow, or care, the easier it is to hypnotize the person. I wonder if anybody can hypnotize me? I doubt it very much. A healthy, sound person cannot be hypnotized. Was the Scotchman you referred to a strong, healthy man, Dr. Fillebrown?

Dr. Fillebrown. Yes.

Dr. Heitzmann. But he suffered a great deal, probably, before he came to you?

Dr. Fillebrown. Yes, I am sorry to say he did.

Dr. Heitzmann. Well, he was really willing to enter upon a trial. Mesmer did the same thing, and Mesmer, who was first looked upon as a great genius and a great discoverer, died in poverty and contempt of the world. The greatest experimenter in hypnotism was a Frenchman. There is a good deal of fascination about it, and the French, being of excitable nature, made use of it. A story is told that a young medical student in France hypnotized his sweetheart, who had come to his rooms, and went out, forgetting all about it. Twelve hours afterward, he went back. The young woman, after having been awakened, gave him a hearty box on the ears. She said, "Will you starve me to death? How dared you to forget all about me?" He had to marry her as a punishment.

There was a physician in one of the French hospitals who hypnotized his patients and suggested to them, most of them being very nervous girls. He had several vials, holding certain chemicals or medicinal substances, and gave an exhibition of the effects of suggestion. He simply held the vial before the patient, and when the vial contained valerian, which is a favorite with cats, the patient began to purr and mew; when strychnia was placed before her, the patient had cramps, and commenced to writhe. Now Dr. Hart, of London, was present, and asked permission to repeat these experiments. He took the same patient, but was wise enough not to suggest anything. He held the bottle of strychnia before the patient, who immediately began to purr and mew, and when he extended the valerian the patient began to get cramps. Of course, all was a humbug. They were not instructed by the doctor, but they heard him say what it was, and they repeated these things in a hypnotized condition. Such things as hypnotism and suggestion do exist. Some years ago a man made public exhibitions in Vienna, and the outcome was that the government forbade all such experiments and drove him out of Austria.

An excellent psychologist, Professor Meynert, whom I mentioned before, positively stated that hypnotism is to be forbidden because it weakens the brain, and every experiment in this line will be punished by the inclination of the patient to become more easily hypnotized thereafter, and fall into hypnotism at the least opportunity. That was his conviction, and now I turn to the essayist and ask him if he is perfectly sure that this hypnotism is an entirely harmless affair? If a man like Meynert, who was a personal friend of mine,—a really good, thoughtful man,—says that hypnotism is not an exactly criminal, but an untoward thing, will other people utilize it for making a dental operation painless,—something which can be done nowadays with comparatively easy methods, using locally hot chloroform vapor, for instance, as Dr. Bödecker tells us?

Once more, the great objection is (aside from the misuse which, of course, is out of the question here),—first, as the essayist has said, not everybody is fit to be hypnotized; and second, if there are thoughtful minds which claim that hypnotism is objectionable, rendering the patient susceptible to all outside influences,—will the essayist, in the face of these facts, maintain what he said at the beginning of his otherwise admirable paper, that hypnotism will become a feature in the office of every dentist? Permit me to doubt it.

Dr. E. D. Fisher, New York. I have seen hypnotism used in a number of cases, and have observed the growth of the position of the subject in medicine. At the meeting of the British Medical Association to which Dr. Fillebrown refers, Professor Voisin, of Paris, France, referred to a number of cases, and described his method. He found it difficult at times to hypnotize all his cases. The method differs with different operators. The process is this, in my opinion: The subject must concentrate the attention entirely on one given object. It is not a question of will-power; there must be an effort on the part of the patient to aid the operator. It is supposed that the hysterical are the most easily affected, but in these very cases it is often impossible. A hysterical person will be attracted by the slightest thing,—a light from the window or a noise from without,—and thus each time destroying the effect already produced. Professor Voisin spoke of the necessity at times of trying for several hours before succeeding, the following attempts, however, succeeding more easily. In his hospital wards he had brass balls suspended over the beds, directing the patients to keep their attention fixed on them, preparatory to his putting them in the hypnotized state.

I need not discuss the physiological side of the question. It has evidently to do with the higher cortical centers, as both the essayist and Dr. Heitzmann have said. The cortex of the brain is not in full functional activity.

I am not thoroughly convinced but that harm may result from the too frequent or indiscriminate use of hypnotism. I have never been an advocate of hypnotism. The reports of Dr. Fillebrown's cases, however, show its usefulness in the relief of pain in certain operations.

Its employment has not become as general in the practice of medicine as its advocates at one time supposed it would. Its efficacy in the cure of organic diseases, if assured, would do away with the necessity of medical research.

It is certainly of great advantage to medicine that so important a subject is now being studied by men of acknowledged position and reputation.

Dr. F. C. Barlow, Jersey City. My father was an old practitioner in New York, and I would like to make mention of one case in his practice which came under my personal observation, as incidental to the subject under discussion. Some few years previous to the late war, there was practicing medicine in New York City a Dr. Morse, who had associated with him a Mrs. Lawson, who was a mesmerist or hypnotizer.

This lady had a married daughter, whom she brought to the office, and having placed her in a hypnotic state, there were some ten or twelve teeth and roots extracted, the patient experiencing no pain from the operation. Upon several other occasions she brought patients, and teeth were extracted under the same conditions and with like results.

Dr. M. L. Rhein. I have paid considerable attention to the literature on this subject, and with all the information that I could glean I feel myself in very much the same position as Dr. Heitzmann. I do not question for a moment the possibility of hypnotism. I believe all who have paid any attention to the subject recognize the possibility of easily producing the hypnotic state. Nevertheless, I cannot but feel a great deal of fear as to the results of using it in dental practice. In thinking over this subject, I have become firmly convinced of the fact that a great many of us use hypnotism to a certain extent in our practice without being at all aware of it. We are often amazed at the ease with which we control certain patients, and the more we work for them the easier we control them ; and in looking carefully over some cases of that kind, I believe that the primary stage of hypnotism is really the cause of our success with these people, and the great praise which they give to the painless manner in which we work for them, and how pleasant it is for them to have work done, in contradistinction to the feeling of—should I say—the majority of our patients. There is one point especially that I want to illustrate. The essayist spoke about the dangerous effects that could be produced by the use and abuse of every medicinal agent which we possess, and especially referred to the use of opium, alcohol, and various other things of that kind. It is just in the line with the use of opium that hypnotism especially strikes me. From all that I have been able to learn from the writings on this subject, it seems to me that if you hypnotize a man once you can hypnotize him more easily the second time, and the sixth or seventh time he is very easily hypnotized by somebody else who may have entirely different views from the professional man who originally put the patient into the hypnotic state. Here, to my mind, is the danger. Not that any direct danger would result from it, but the possibility of the hypnotic tendency growing in the patients to such a degree that they would be ready to receive the hypnotic suggestion of people who were not professional men. I wanted to speak of this point,—of this danger, as it seemed to me,—though practically I know nothing of the matter.

Dr. S. C. G. Watkins, Montclair, N. J. Although I have given this subject considerable thought, I feel that I know very little about it. I have used hypnotic suggestion to some extent in my practice since a conversation I had with Dr. Fillebrown a year ago, when he told me his experience. I followed his directions, as he has given them to you here this evening, and in several cases I was able to excavate sensitive teeth with little or no pain. There are many cases where we all use hypnotism, but perhaps you have not considered it under that name. I had a case only a few days since, where a lady, immediately on being received in the reception-room, told me that she was the worst patient that I ever had come to me. She said she never allowed the rubber-dam to be placed in her mouth, that the engine could not be used, that everything had to be done by hand. She said she had grabbed the dentist's arm on every occasion, had kicked over the engine, knocked down the instrument-case, and so on. I told her she was going to be the best patient I had ; that I was going to use the engine, and put on the rubber-dam, and that I would not hurt her. You would be surprised to see what an angelic patient she proved to be. As Dr. Fisher stated, the hysteric person is the one who is difficult to control. The person with a strong mind will concentrate his thoughts, and help the operator, and will not fight in opposition to him. He mentioned placing an object over the bed in the hospital, and the sick persons fixing their gaze upon it until the doctor came along and hypnotized them. Upon retiring at night, place your mind on a certain object,—sleep,—and think of nothing but sleep. It is surprising how easily you will drop right off to sleep. I place my mind on sleep, and after repeating that word "sleep" for a very few minutes, I know nothing more. I had a patient, a short time ago,—a young lady in robust health, but very nervous. After some little talk with her, I got her to assist me, and in the course of six or seven minutes she was hypnotized so that she sat there in that drowsy, don't-care condition, and allowed me to operate with perfect freedom. Every little while I would suggest sleep and quiet, and I could continue the operation with satisfaction and comfort to her and myself.

Dr. O. E. Hill, Brooklyn, N. Y. Many years ago, when I was a boy, seven or 'eight of us went together to be mesmerized. It was called "mesmerism" then. A gentleman mesmerized three or four of us, and it was repeated for several days, until finally the gentleman would stop the boys on the street, whenever he saw them. We concluded that that was going too far, and told him that he must stop using that influence upon those boys, or he would be punished in some way. He tried it a day or two after that upon the boy who was most under his influence. That night eight or ten of us visited that man's house with a lot of missiles that boys usually carry (and a great many that they do not usually carry), and his house was thoroughly pelted. After that none of us were ever interfered with. That is my early experience with mesmerism. Further than that, it is a question which I do not care to discuss at all, except that there is no question whatever that every dentist who practices his profession intelligently uses some influence—call it whatever you choose—on his patients. If he does not, he certainly ought not to be a dentist. Any professional man who has to do with the ailments of men, must be kind, and must try to convince his patient that he is doing the best he can for him, and that he will hurt him as little as possible, and that the patient must endure pain as best he can. I do not suppose Professor Fillebrown practices that entirely in his office. I think he is unfortunate in using the word "hypnotism" or "mesmerism." It may be necessary to use that term in a scientific discussion or in a paper, but it certainly means kindness, and nothing more.

For instance, I had a little girl come to my office once who was the most nervous child I have ever seen. When she was first brought to me she would only come as far as the hall. The first thing I did for that child was to take her beside me on the sofa, take a stick and pumice-stone, and just polish the front teeth. After that I cleaned them for her. After a while I could extract a tooth for that child, and though the tears would run down her cheeks, she would say to her mother, "Mamma, it didn't hurt me." She lived until she was about eleven years old. I never said to the child I would not hurt her at all. I said I would hurt her only a little bit. Is not that your idea, Dr. Fillebrown?

Dr. Fillebrown. Yes, but I would say to the child, "This will not hurt you; and if it does hurt you, you will not mind." This positive form of statement will make the anesthesia more perfect, and the qualifying statement will save disappointment.

Dr. Hill. I think that professionally and scientifically, this word "hypnotism" is all right, but it is really an unfortunate word for us to use; for I think if it became notorious and public that any gentleman did that, you would not need a gun to drive your patients away from your office. Gentlemen might come to you, but ladies would not.

Dr. William Jarvie, Brooklyn, N. Y. I really don't know much about hypnotism, and I came here at quite a little personal inconvenience, that I might learn something. Dr. Hill's remarks have made me think that perhaps it would be well to say a few words, for I understand him just the reverse of Dr. Fillebrown. Dr. Hill says he tells his patients, "I may hurt you, but I will not hurt you more than I can help." Dr. Fillebrown says he tells his patients, "It will *not* hurt you." Dr. Hill's idea is that by kindness, sympathy, and due consideration for his patients' feelings, he gets their confidence, and is enabled in that way to allay their fears, and we know that the worst suffering our patients endure is mental suffering. I understand Dr. Fillebrown to say that sometimes he carries his patients on to suggestion and then to sleep, which I understand to be unconsciousness.

Dr. Fillebrown. It depends upon the patient. It is not more than one out of ten where it affects the consciousness.

Dr. Jarvie. I have never thought of such a thing as hypnotism in connection with this influence we may wield over our patients by kindness and sympathy and consideration. I do not understand that to be hypnotism at all.

Dr. Fillebrown. It certainly is.

Dr. Jarvie. What is hypnotism? Let us have the definition of it; because we are using a term that signifies one thing in the mind of one person, and another thing in the mind of another person. As I understand it, it is so influencing the mind of another person that that other person follows your dictation in thought and in action,—having absolute control of that person's will and movements. That I understand to be hypnotism.

Dr. Nelson T. Shields. A patient comes to the office in the winter-time, and you politely say to her, "Madam, step to the fire and warm yourself." She will invariably do so. If you telephone a patient, "Will you prefer ten or eleven o'clock? I would like you to come at eleven," she would invariably say ten o'clock. If through the telephone you say, "Madam, come at eleven o'clock to-morrow," she would say, "Yes, doctor," and it is settled. In doing that, you do not exercise any mental effort to hurt the mind of another person, but in this manner of suggestion you can influence a person exactly as you please. I had a nervous patient once who fairly screamed by the time I got to her side. She told me that she was extremely nervous, and I stated to her, "I prefer my patients to be nervous. If you should sit here and say, 'I am the best patient you have,' I would not like it nearly so well. I prefer patients should be nervous, because I know they will soon have implicit confidence and be brave." By exercising such influence you invariably get good results.

Dr. Fillebrown. The subject has received quite as favorable consideration as I expected, and I am very much pleased. I have been surprised, since coming to your city, to find how considerably suggestion is used here already. I learn that at one of the hospitals here it is used systematically and quite frequently. I am not so much surprised to hear so many express the fact that they have used it. It makes a great difference which school you are following. There is not time to go into a discussion of differences to-night, but it makes a great deal of difference whether you are a Charcotist or a Bernheimist. Dr. Hill has based his idea of hypnotic suggestion on the exhibitions given by hystero-epileptic patients, and its effects on them, and that, as used by Charcot, it increases their trouble instead of lessening it. Charcot could find in the course of ten or twelve years only about a dozen persons who were favorable for him to operate on. He, as well as Dr. Luys, made his theater a place of public exhibition. He took these patients and used them for three or four years, and kept them under training until they learned to anticipate his bidding. Instead of suggesting a cure for their hysteria, he suggested an increase of it, and so got all these extravagant exhibitions with which we have nothing to do whatever. Dr. Heitzmann says it is only the diseased and the sick who are affected. Drs. Charcot and Luys, whose teachings he follows, have used only the sick and the afflicted to exhibit, and consequently he presumes that it is only those who will be affected. Go to the city of Nancy, in France, and you will find Liébeault, who practices this and has practiced it for over thirty years with never an unfavorable result; also Dr. Bernheim, who has practiced it for fifteen years, and hypnotized thousands of times, and has written the best work on the subject extant. Bernheim's experiments have nearly all been made on healthy men, to avoid the complication that has been mentioned here to-night, that it is only women who are affected by it. Every one will find that healthy persons are equally affected, and are just as susceptible as sick ones. My best and healthiest male patients are just as sensibly affected by it as are the sick ones or women. If Dr. Charcot, Dr. Luys, and others had, when those nervous patients were hypnotized and made susceptible, suggested that their ills would leave them, a cure would most likely have followed. Charcot is dead, and with his death has begun the decline and fall of such false doctrines. Dr. Luys lives, but Dr. Hart has reviewed his experiments, and has shown, as Dr. Heitzmann said to-night, that Luys's subjects were tricksters, and that they had become able to anticipate what was expected. I will be a little more charitable. I will say that the subjects are educated in hypnotism, and have grown to know and catch the suggestion from the slightest indication ; and when a certain thing is handed to them, and the operator remarks that this is a certain medicine, they know that a certain result will follow, and when they are put off the track they are at fault. We are working toward a better condition, and toward a better understanding of what are the errors of the past. Dr. Rhein hit the nail right on the head. His own remarks answer him. We are all of us practicing this from day to day, and our success depends upon it. I am glad it has come to his knowledge. Most of us have been practicing this for years without knowing what we were doing. Is it worse to practice a thing when it is made systematic and under our control, than to do it ignorantly and not know how to act when you get into trouble? If you will go home and take with you the little smattering that has been given you to-night, and follow it up with further study, you will be able to use it, and you will be vastly better off to do it knowingly than to do it ignorantly.

Dr. Rhein. What about my question in regard to the increasing tendency to be more easily hypnotized each time, and the danger resulting therefrom?

Dr. Fillebrown. A person does not easily come under the control of another person. If you are afraid of it, when your patient is hypnotized, lock him up, so to speak. Say to him, "No one else will hypnotize you. You cannot be hypnotized until you return to me."

But the question deserves a better answer. My own experience and observation lead me to think this danger greatly over-estimated. None of my patients have shown the slightest tendency to lose control of themselves so as to be hypnotized against their will. On the contrary, one of my most susceptible patients had been greatly benefited, and has declined to submit to further hypnosis because it had done its work. While I have not tested the matter, the patient seems to be as far from being affected as before the first attempt.

It is true a patient is more easily hypnotized after he has become accustomed to it. It is a subjective condition, and practice increases the ability to give up to it. The knowledge of this is ample protection. The patient can easily prevent any approach of hypnosis. I do not believe repeated hypnotizing renders any person any more liable to be hypnotized against his will.

Dr. Jarvie thinks Dr. Hill and I are at variance. The condition Dr. Hill describes that the patient is put into, by this kindness and sympathy, is hypnotism. I agree with Dr. Hill. I do not like the name, but there is none better. He could not furnish one any better. Others have tried, and cannot ; consequently we must use it. The hypnotic condition, as it is understood, is a condition where the voluntary powers of the mind are held in abeyance, and the patients become more susceptible to a suggestion from without which will act within. My friend Dr. McKellops made at Chicago an objection similar to that of Dr. Hill. He said, "I can do with kindness just what Dr. Fillebrown does with hypnotism." He described his methods, and when he got through I said to him, "You have done the very thing I have been describing, and you are not as yet fully conscious that hypnotism and McKellopsism are synonymous."

This faculty of the human mind exists; this condition exists every time that the mother takes her baby when it is hurt, and kisses the pain away. I was in the steam cars one night some years ago, before I knew the power of suggestion. There was on the train a lady with a little child that had been crying for an hour or more. The child would not be quieted, and the mother and the child were both distressed. I sat on the opposite side of the car, and I could not longer resist the impulse to try and help her out. I said, "Madam, take the child, let it lie quietly on your arm, and it will go to sleep." With my help she got the child into an easy position, and it stopped its crying at once, and slept quietly all the rest of the journey. I was practicing this thing very ignorantly then Next time I shall not be so ignorant, by any means. Every time a person becomes especially interested in a speaker he is in a degree hypnotized. When a person sits absent-minded, as we call it, he is hypnotized more or less. When a person is under great excitement on any subject, as, for instance, in the time of religious revivals, he is often completely hypnotized. All mental healing is done by hypnotism and suggestion. The power of nine-tenths of the medicine we take is dependent upon suggestion. This has been proved over and over again. You give a person a cathartic, and if he expects it to be an emetic it is very likely to act as such. (Laughter.) It is amusing, but human nature is amusing.

It is a well-established and a well-recognized principle that the expectancy of the patient has a great power to aid the action of the medicine. I will say the same of homœopathic medicines as I do of ordinary medicine: the power depends on the suggestion that goes with it. Homœopathic medicines do seem to cure as often as others. It is the power of suggestion that goes with it that produces the cure. Why should we not recognize this physiological condition? I say it is a normal condition. Because evil can be done with it, there is no reason why we should not use it for good purposes. I hope more will take Bernheim and read him. In his book he gives many cases which will not particularly interest us, but all the essential parts will be found worthy of attention. My prophecy was a little misunderstood. I say that within a few years a great part, and perhaps almost all, of the dental profession will have its practice governed by the *principles* of hypnotic suggestion. All will not use it formally, but all their movements and thinking will be influenced by it. In proof of that, I wish to call attention again to the statement of my friend Dr. Rhein, who says we are all of us practicing it all the time. Dr. Hill says one who does not practice it is hardly worthy of the name of dentist. This shows that you do use it. You may not systematize it, as I have done, but most of you use it. We have now published a little volume called "Power through Repose," which explains the application in a simple form. A knowledge of the same thing came to me many years ago through a Methodist bishop of Philadelphia, who said to a friend, "I have found a new philosophy by which I am governed, and with which I get along much better, and it is the philosophy of repose." That philosophy of repose has for its basis hypnotic suggestion.

Dr. Walker. I move a hearty vote of thanks to Dr. Fillebrown for his kindness in presenting such an admirable paper.

Motion carried. B. C. NASH, *Secretary.*

NEW ENGLAND DENTAL SOCIETY.

THE thirty-first annual meeting of the New England Dental Society was held in Worcester, Mass., October 5 and 6, 1893; Dr. S. G. Stevens, of Boston, Mass., president, in the chair. Papers were read by Dr. Louis Ottofy, of Chicago, Ill.; Dr. Geo. F. Harwood, Worcester, Mass.; Dr. David Harrower, Worcester, and Professor A. S. Kimball, of the Polytechnic Institute of Worcester.

The attendance was small but enthusiastic, and the meetings exceedingly interesting. A supper was served at the Lincoln House. The following were elected officers for the ensuing year: Dr. Geo. F. Cheney, St. Johnsbury, Vt., president; Dr. James H. Daly, Boston, Mass., first vice-president; Dr. Dwight M. Clapp, Boston, Mass., second vice-president; Dr. Edgar O. Kinsman, Cambridge, Mass., secretary; Dr. Marion L. Woodward, Boston, Mass., assistant secretary; Dr. Geo. A. Young, Concord, N. H., treasurer; Dr. Jos. King Knight, Hyde Park, Mass., librarian. Executive Committee: Dr. S. G. Stevens, Boston, Mass.; Dr. W. E. Page, Boston, Mass.; Dr. A. F. Townsend, Worcester, Mass.; Dr. C. H. Hayward, Peterboro, N. H.; Dr. E. B. Davis, Concord, N. H.

EDGAR O. KINSMAN, *Secretary*,
15 Brattle Square, Cambridge, Mass.

WOMAN'S DENTAL ASSOCIATION OF THE UNITED STATES.

THE regular monthly meeting of the Woman's Dental Association was held December 2, 1893, at 1300 Arch street, Philadelphia; President Dr. Mary H. Stilwell in the chair.

Dr. Edward C. Kirk read a paper entitled, "Gum-Lancing in Difficult Primary Dentition."

The next meeting will be held at 1308 Walnut street, Philadelphia, January 6, 1894, at 7.30 P.M.

ELIZA YERKES, *Rec. Sec.*,
4004 Chestnut street, Philadelphia.

SOUTHERN CALIFORNIA ODONTOLOGICAL SOCIETY.

AT the regular annual meeting of the Southern California Odontological Society, held in the Chamber of Commerce rooms, Los Angeles, November 28, 1893, the following officers were elected for the ensuing year: Dr. M. H. Menges, president; Dr. A. P. Hayes, vice-president; Dr. F. M. Parker, secretary; Dr. G. A. Millard, corresponding secretary; Dr. C. V. Baldwin, treasurer; Dr. D. R. Wilder, librarian. F. M. PARKER, *Secretary.*

DENTAL SOCIETY ANNOUNCEMENTS.

LOUISIANA STATE DENTAL SOCIETY.

The Louisiana State Dental Society will meet at Tulane Hall, New Orleans, February 7, 1894. All reputable dentists are cordially invited to attend and participate in the meetings. The date has been fixed for the day following Mardi Gras, in order that those attending may have the opportunity to witness the great festivities. A. J. Bercier, *President.*

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EDITORIAL.

HYPNOTIC SUGGESTION IN DENTAL PRACTICE.

Considerable prominence has been recently given to the use of hypnotic suggestion as a means for controlling nervous and timid patients when undergoing dental operations, and for reducing their sensitivity to pain. The application of hypnosis in dentistry is but the natural outgrowth of its use in medical practice, where it has acquired some importance from the therapeutic standpoint, largely through the investigations of Charcot, Liébeault, Bernheim, Forel, Wetterstrand, and other psycho-therapeutists, who have during recent years made it a subject of especial study. The science of psycho-therapeutics is not yet out of its formative stage, notwithstanding the immense amount of labor and research which has been expended upon it. The special knowledge of the phenomena upon which it is based, while comparatively thorough and accurate as far as it goes, needs further study and better classification before broad generalizations capable of exact application can be safely made upon it. More than this, the strictly scientific knowledge of the correlated psychic phenomena embraced within its scope is confined to a very limited number of individual workers in this field, so that it is far from being common knowledge.

The whole subject of hypnosis and kindred psychic states or phenomena, so far as the general public is concerned, is still hampered by an atmosphere of mystery and superstition which has seemed to be a necessary concomitant of all inquiries into the legitimate phenomena of mind, and has tended to connect these with occultism, spiritism, telepathy, and the whole genus of aberrations dependent upon false reasoning and erratic imagination. This condition of mystery surrounding the study of hypnosis, arising from a lack of sufficient knowledge by the average individual, the element of superstition which any reference to it usually arouses, and the feeling that it has a certain uncanny quality, together constitute an element which must have its full weight of consideration as an objection when it is proposed to utilize hypnotic suggestion in dental practice.

When the facts relating to the phenomena of hypnosis come to be as thoroughly known by the public as are those pertaining to anesthesia by ether, chloroform, or nitrous oxid, the objection noted will have less force ; but until then it must remain an obstacle to its employment, except under certain very narrow conditions.

There are other reasons why the use of hypnotic suggestion should be guardedly accepted as a legitimate procedure in dental practice. The limitations to the hypnotic state are not as yet clearly made out. The susceptibility of different individuals to hypnosis varies through a wide range, from a slight drowsiness upon the one hand to profound lethargy and catalepsy upon the other, and the effect of the condition upon the subsequent function of the cerebral cortex is not accurately known. Whether there is permanent impairment of the cortex, either organic or functional, remains to be seen. It is known that an increased susceptibility is produced by successive hypnotic impressions, and this fact alone should lead us to regard the utility of the measure with suspicion. One school of physiological psychologists even assert that the phenomena of hypnosis are in themselves the expression of a neurosis, which, if true, would imply that the neurosis was intensified by repetitions of the hypnotic impression, with a corresponding departure from physiological health.

The psychic relationship created between the patient and operator is not above criticism in many, if not all, cases. The suppression of all volitional effort upon the part of the patient and his absolute domination by the will of the operator, is of questionable character upon ethical grounds ; this even where the operator is of unquestioned integrity, for it has not been demonstrated that the total surrender of his individuality to the operator is again completely recovered by the patient. This objection applies with multiplied force where the honor of the operator is not without its weak spots, and the temptation to make a wrong use of the temporary control is strong. It is the objections as noted which lead us to, if not condemn the procedure, at least suggest caution in its adoption in dental practice until a better understanding of the subject is had both by dentists and the general public. There can be no doubt of the demoralizing effect it would have at the present time upon the clientele of any dental practitioner, were he to generally publish to his patients his intention to subject them to hypnotism upon occasion, even for the relief of pain.

Thus far our criticism has been applied only to that advanced stage of hypnosis characterized by complete subjection of that portion of the cerebral cortex concerned with volition, and accompanied to a greater or less degree with the phenomena of sleep, anesthesia, and possibly catalepsy. There is, on the other hand, an early part or stage of hypnosis, wherein certain phenomena are produced by the dynamic function of the suggested idea ; these are manifested long before sleep supervenes, with consciousness fully active and volition voluntarily subjected, a state of passivity or non-resistance which can be, and is, daily utilized by dental operators, to the mutual advantage of themselves and their patients. The manner, conversation, poise of character, mental attitude of the operator,—all are factors which help to determine the degree of control which it is possible for him to exercise over his patient, and the control thus gained is the result of suggestion, conveyed perhaps unintentionally to the mind of the patient, producing an effect which, if carried further, would lead to hypnosis in certain cases, just as certainly as if the usual hypnotic technique had been employed.

Illustration of the force of suggestion, quite apart from hypnosis, discreetly employed for the control of patients, and the help which it affords them in the endurance of pain, may be found in the experience of all practitioners of dentistry. The qualities denominated force of character, tact, etc., in the management of nervous patients owe their efficacy largely, if not entirely, to the dynamic effectiveness of suggestion. Its effect is proportioned to its proper and intelligent use by the operator, and the suggestibility of the patient. It is in this connection that more thorough knowledge is needed, and where careful observation and study should lead to valuable results. If suggestion used empirically can so influence patients—children, for example—that they will not only endure ordinary dental operations quietly, but even, as there is abundant reason to believe, an actual decrease of pain may be so brought about, the systematic study of the psychological relationships of suggestion for the purpose of reducing the suffering attendant upon dental work must necessarily yield more satisfactory results. A study and classification of these phenomena should in time furnish a good working method, capable of more or less general application in a scientific way.

We believe that profound hypnosis, for the reasons given, has at this time little if any practical utility in dental practice, while the objections to such a use of it are sufficiently grave and important to bar it out excepting under very special and peculiar conditions. But that there is a large field of usefulness for an intelligent use of suggestion in the control and inhibition of pain for dental patients we do not doubt.

We shall present in an early issue a communication from an expert psychologist bearing upon this question, giving a full analysis of the phenomena of suggestion, showing its potentiality in the production of various mental conditions, and how it may be practically utilized for the ends noted.

"HOSTIS HONORI INVIDIA."

THE editor of the *Dental Review*, formerly secretary-general of the World's Columbian Dental Congress, and now chairman of the committee having in charge the publication of its official transactions, publishes on page 904 of the November number of his journal the following statement, which he made before a recent meeting of the Chicago Dental Society concerning the congress report:

> "I have spent one week . . . looking over the papers and discussions. I have been very much gratified, in quite a number of sections, to find that the discussions are better than those that have been published by the journals, especially by the DENTAL COSMOS. That journal had some trained reporters and six or seven untrained ones, who were unfamiliar with the technical terms used by dentists, and very frequently what was said was so totally twisted around as to fail to express any meaning."

The actual facts are that the DENTAL COSMOS had in its service seven reporters, all of them experts as reporters, and all of them experienced in the work of reporting dental speakers.

That there are errors in the report is true, but they are largely those made by the speakers themselves, and are such as are common to extemporaneous speaking. Considering all the circumstances, the wonder is that they are so few. The COSMOS report, we think, speaks for itself, and if the official transactions are as free from errors, there will be no cause for complaint by those who will care to read the report again.

There are unfortunately critics who love a shining mark, because they know that a fair shot with mud is displayed to best advantage on that kind of a target; but back of the present instance is a certain ethical irregularity which lacks originality, for it was long ago pointedly condemned by one of the apostles, as related in the fifth chapter of Acts.

TAKING IMPRESSIONS OF THE MOUTH.

THE article by Dr. J. W. White upon this subject which appears in the present issue was prepared by him for publication just before his death. A monograph bearing the same title was published by him in 1871. The edition was rapidly exhausted, since when numerous requests for its republication have been received, in compliance with which the author undertook and completed a thorough revision of the article. It was largely rewritten; all that had become obsolete was rejected, and whatever was new and of value was incorporated. Its publication has been delayed by the pressure of other matter and by the lack of favorable opportunity. We present it in this issue, believing it will be appreciated by the large body of dental students and recent practitioners, as was the former article of which this is the outgrowth.

In its present form the article is just as it was prepared for the press by the author, with the exception of some changes in chemical terminology, which have been harmonized with present standards.

BIBLIOGRAPHICAL.

ANATOMY, DESCRIPTIVE AND SURGICAL. By HENRY GRAY, F.R.S., Lecturer on Anatomy at St. George's Hospital, London. New American from the thirteenth enlarged and improved English edition. Edited by T. PICKERING PICK, F.R.C.S., Examiner in Anatomy, Royal College of Surgeons of England. In one imperial octavo volume of 1100 pages, with 635 large engravings. Philadelphia: Lea Brothers & Co., 1893. Price with illustrations in colors, cloth, $7.00; leather, $8.00. Price with illustrations in black, cloth, $6.00; leather, $7.00.

A new edition of this work is always sure of a cordial welcome. It has for so many years been an accepted standard, and its general excellence is so fully recognized, that no comment in this line is necessary other than to say that the present edition is fully up to the standard always heretofore maintained, and several improvements have been made. The whole series of illustrations has been re-engraved wherever clearness could be promoted, many new illustrations have been added, and a liberal use of colors has been made to give prominence to attachments of muscles, and to veins, arteries, and nerves. The publishers in their announcement make the following statement: "As heretofore, the revision has been most thoroughly performed, so that the work is kept always abreast with the advances of its science. Especial attention has been paid to the application of anatomy to surgery, and the work is therefore indispensable to all who find in the exigencies of practice the need of recalling the details of the dissecting-room."

The latter clause of the quotation we believe to be a simple statement of the facts, amply borne out by an examination of the work; but to the initial statement that "the revision of the work has been most thoroughly performed" we take most positive exception in so far as it applies to the mouth and teeth,—*i.e.*, those departments included within the special domain of dental anatomy and histology. If this phase of the work has been thoroughly revised, then the revision has been done by some one utterly unfamiliar with its progress during the past thirty years, which simply means that most of the views then held in this particular field are to-day not only obsolete but palpably wrong. There is not in the whole work an illustration of a human denture or any part of a human denture that is not a monstrosity. Can it be that the delineation of the teeth is meant to be simply diagrammatic? Probably not, as the care and faithfulness displayed in all other parts of otherwise faultless illustrations do not permit such an explanation. We believe it is simply due to the ordinary and almost universal ignorance of such matters among physicians, though in a work of this high character otherwise, one which is a recognized standard as a text-book, used both by medical and dental students, it constitutes a grave and unpardonable error, which should have been corrected years ago. Either the sections pertaining to dental anatomy and histology should have been correctly done by a medical man, or, preferably, have been put in charge of one of the many specially trained anatomists in the dental ranks to present the subject as it should be done, and harmonize it with the high standard of the work in the other departments.

A few of the errors and inaccuracies which we have met with in the dental phase of the work are as follows:

The description of the alveolar process and alveoli, page 195, is meager and inaccurate. No mention of the alveoli of the bicuspids is made. The surgical importance of this process in antral and nasal lesions demands a better description.

In the illustrations showing the development of the inferior maxilla at different points of life, on page 207, Fig. 169, which is said to show the bone "at puberty," contains the temporary molars and the first permanent molars, the second permanent molar being absent. It is therefore a bone at from six to eight years,—a conclusion reinforced by the lack of development of the mental process as shown.

In Fig. 174, showing a side view of the skull, the teeth are shown in malocclusion, and are badly drawn individually.

In Fig. 443, a plan of the fifth cranial nerve taken from Flower, the second bicuspid of the superior denture is shown with bifurcated roots, and the first bicuspid with a single root.

The mouth and teeth treated as part of the apparatus for the digestion of food are considered under the section, "Organs of Digestion." Less than a page is devoted to the mouth proper. The teeth receive more generous treatment. The term "fang" is generally used wherever the root of a tooth is intended to be indicated. This word was discarded long ago in dental literature as inadequate and misleading. In describing the roots of bicuspids, no distinction is made respecting the difference between the roots of the first and second. In the illustrations of permanent teeth of the lower jaw, Fig. 510, the anterior root of each of the molars is figured as larger than the posterior root.

The description of the cusps and crowns of the molar teeth is wrong. "The third molar," it is stated, "is smaller than the others, and its axis is directed inward," but the author omits to state which jaw is referred to. The whole article on the structure and development of the teeth is superannuated and useless, in the light of what has been done in recent years. The primitive dental groove of Goodsir is the anatomical basis of development from which the subject is treated, and the entire chapter is of the same venerable character.

Dental anatomy and histology may not have the especial value and importance which we as dentists attach to it, but the facts of the science are of importance as facts, and are entitled to their proper recognition in a comprehensive treatise on human anatomy intended for the enlightenment of students and practitioners. We have pointed out some of the defects in the present work in this department, not in a hypercritical spirit, but in the hope that it may help toward their correction in a future edition, and so in a degree furnish to our medical brethren more reliable information upon this (by them) usually neglected subject.

OBITUARY.

DR. J. H. SMITH.

DIED, at West Haven, Conn., November 9, 1893, of angina pectoris, Dr. JOSEPH H. SMITH, in the sixty-fifth year of his age.

Dr. Smith's illness had been of some fifteen months' duration, during most of which time he was a great, though patient, sufferer. He was born in that part of Middletown now called Cromwell, Conn., May 21, 1829. He entered upon the study of dentistry in 1857, with Dr. Parmele, and soon after removed to New Haven, where he became a prominent practitioner, and continued so up to the time of his illness. Some months since he retired to West Haven, with the hope that the change might benefit him and prolong his days, but after much suffering he passed away on the date above given.

Dr. Smith was a progressive man, and was ever ready to adopt the improved methods and appliances of his profession. About 1861 he made extended experiments in materials for continuous-gum work, and at about the same time made the body and carved block teeth for rubber work, an early specimen of which he treasured up to the time of his decease. He abandoned rubber work, however, at the time of the establishment of the royalty of the Vulcanite Company. In 1863 he was brought prominently before the public by his interest in the use of nitrous-oxid gas for the extraction of teeth, in connection with Drs. Colton, Allen, and Hurd. But he ever manifested a superior interest in the salvation of teeth, and its outcome was the manufacture and introduction of his well-known oxychlorid of zinc filling, and later of his adamantine phosphate cement, materials which are too well established with the profession to call for further comment here.

At the meetings of the New York and Brooklyn dentists Dr. Smith was a frequent visitor. In the times of the American Dental Convention he was a prominent member, and was for several years its secretary and treasurer. He was also a member of the American Dental Association. He was one of the original members of the Connecticut State Dental Association, and was at one time its secretary and for a number of years its treasurer. He was also a member of the Connecticut Valley Dental Society. In the days of the *Dental News Letter* he was a subscriber to that journal, and has been a continuous subscriber since to its successor, the DENTAL COSMOS, always gratefully acknowledging his indebtedness to them as valuable aids in his profession.

Dr. Smith was a man of fine presence, genial, warm-hearted, and generous, and it is said of him that he often gave gratuitous services to those in need of help and unable to pay for it. He was twice married. His first wife was Miss Charlotte A. Spalding, of Middletown, by whom he had four children, all now deceased. His second wife was Mrs. L. B. Betts, of Litchfield, Conn., and she and her three children survive him. His funeral was attended by prominent dentists and citizens.

DR. WILLIAM STEPHEN HOLBROOK.

THE many friends and the dental profession, of which he was an honored member, have experienced a loss hard to realize in the death of Dr. Holbrook, which occurred at his residence, No. 34 East Park street, Newark, N. J., Sunday evening, November 5, 1893. He was descended from a long line of revolutionary ancestors, and was the son of the late A. M. Holbrook. He studied dentistry under the tutelage of his brother, Dr. Charles W. F. Holbrook, and graduated with honors from the Baltimore College of Dental Surgery in March, 1892. Passing the state board of examination and registration in dentistry in April of the same year, he was immediately entered into membership of the State Society and the Central Dental Association of Northern New Jersey. Dr. Holbrook was modest and unassuming in disposition, yet firm in opposition to all forms of insincerity, and steadfast in his friendships. It is supposed that prolonged application to his professional duties overtaxed his strength and laid the foundation of the disease of which he died. Young, talented, accomplished,—an ability marked with the rare combination of mechanical skill and artistic taste,—his future was full of brilliant prospects and assured success in his chosen profession.

CHAS. A. MEEKER.

DR. THOMAS ROBSON.

DIED, in Philadelphia, Pa., December 21, 1893, THOMAS ROBSON, D.D.S., in the fifty-eighth year of his age.

Dr. Robson had been in the successful practice of dentistry in Philadelphia, Pa., for upward of thirty years. He was a skillful mechanical dentist, and had a large practice. He was generally esteemed for his courteous demeanor, and was genial in his intercourse with his fellow-men. He was a soldier in the war of the Rebellion, serving as private and corporal. Dr. Robson was a graduate of the Pennsylvania College of Dental Surgery, class of 1865.

PUBLISHER'S NOTICE.

THE OPENING YEAR.

THE Congress of dentists at Chicago has been characterized as the beginning of a new epoch in dental history. The trend of the thought awakened by the proceedings of the Congress ought to begin to make itself manifest during the year 1894. The dentists of the world are already familiar with the work of the Congress through the comprehensive reports of the DENTAL COSMOS. These reports, it is safe to say, have been read by the great majority of the men who make history in dentistry,—the reading, thinking, progressive practitioners throughout the world. Wherever these are, there the DENTAL COSMOS is found. No other journal offers such an audience to the dentist who has something to say to his fellow-practitioners.

It were idle to speculate now upon the probable effect on dental thought, dental education, and dental practice ; but readers of the DENTAL COSMOS will find in its pages whatever comes to the surface to point the way of dental progress. It will continue to serve dentistry as no other journal can. The lines are now out for original investigations into moot-points which should be settled authoritatively, to which settlement the DENTAL COSMOS hopes to contribute. Recognizing that such work enhances the practical value of the journal to dentists, it is now, as it has been for years, our custom to suitably compensate writers of papers which add measurably to the sum-total of dental knowledge. Such papers are always gladly received and paid for.

The year ought to be fruitful of advancement in dentistry. Whatsoever it may bring forth in the development of theory or practice, readers of this journal can rest assured that the DENTAL COSMOS will record every forward step. They have the entire panorama of dental progress before them. Dentists who do not read it, can at best get but occasional glimpses of what is going on. The tide sets with a strong impetus toward yet higher achievements. Be it your part to "take the current while it serves." Send in your subscription promptly, and the current will serve you all the year.

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THE S. S. WHITE DENTAL MFG. CO.

PERISCOPE.

A Contribution to the History of the Discovery of Modern Surgical Anesthesia, with some New Data relative to the Work of Dr. Crawford W. Long.—The true story of the first discovery of anesthesia, and of the circumstances connected therewith, has not yet been told in print. Reliable history is never written by the generation which makes it. The generation which inaugurated the era of painless surgery has passed away; the participants in the long and bitter controversy over the question of priority have disappeared; and those of us who have since come upon the scene may now undertake to gather up the data relating to that great discovery, unaffected by favor and unbiased by prejudice.

In 1839, Velpeau, of Paris, described the attempts to find some agent capable of preventing pain in surgical operations as nothing less than chimerical; and in 1846, Sir Benjamin Brodie, of London, said, "Physicians and surgeons have been looking in vain, from the days of Hippocrates down to the present time, for the means of allaying or preventing bodily pain." Yet four years and a half before that statement was made, surgical anesthesia, under the influence of ether, had become a demonstrated fact in a Georgia village, in the hands of Dr. Crawford W. Long. The claims of Dr. Long to the honor of this discovery have been presented to the world by no less a champion than the distinguished J. Marion Sims himself. Dr. Sims's article appeared in the *Virginia Medical Monthly*, May, 1877; but it was hurriedly prepared on the eve of the author's departure for Europe, after an imperfect correspondence with Dr. Long and others, and contains some errors which the latter was anxious to have corrected. Upon these errors the claim has been raised that to another belongs a large part of the credit which the profession has accorded to Dr. Long.

My own interest in this matter is due to an accident, which need not be related here. For the purposes of this paper I have been kindly furnished by the Long family with all the documents, correspondence, and certificates which had been gathered by Dr. Long in support of his claim to priority. I have had access to papers which Dr. Sims never saw. I have talked with some persons, and corresponded with others, who were personally acquainted with Long and his work in 1842, and am thus able to present some features of the case hitherto unpublished.

The paper of Dr. Sims had its origin in an interview with Dr. P. A. Wilhite, of Anderson, S. C., October, 1876.* Dr. Wilhite was witnessing one of Dr. Sims's operations in New York, and remarked that he "assisted at the first operation ever performed under the influence of ether." He then said that this operation was done by Dr. C. W. Long, of Jefferson, Ga., in March, 1842, while the patient was completely anesthetized with sulfuric ether. He "presumed that he (Wilhite) was the first person who ever profoundly etherized any one," and then related how he had playfully and unintentionally etherized a negro boy to the point of complete anesthesia in the fall of 1839, near Athens, Ga. Sims's article makes it appear that four young men—Wilhite, Groves, and two Longs (relatives of Dr. Long)—were medical students in the office of Dr. Long prior to the events of 1842, and the author states that Wilhite's story about the negro boy encouraged Long in his belief that ether might be used for surgical purposes. These statements of Sims, based entirely upon information received from Wilhite himself, have caused the friends of the latter to magnify his relation with this matter, and even to enter a claim in his behalf.†

As a matter of fact, Wilhite did not become a student of Dr. Long in his office until the latter had done several operations under ether. After graduating at the University of Pennsylvania, in 1839, Dr. Long spent one year in

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* Dr. Wilhite died in the early part of this year [1893]. I heard of his death, for the first time, after this paper was begun.

† See "Transactions of South Carolina Medical Association," April, 1883, and also "History of Surgery in South Carolina," by Dr. E. F. Parker, *North Carolina Medical Journal*, June, 1893.

New York city, and returned to Jefferson, Ga., to practice medicine in the summer of 1840. It is not likely that he would have attracted four students to his office at the age of twenty-five. He had no students under him until after his marriage, August, 1842, and the first was his cousin, D. J. Long. In another place in Sims's paper, Wilhite is made to say that he assisted Dr. Long in operations "under the influence of ether in 1843 and '44, while he was a student in Dr. Long's office." Wilhite was not even present at Dr. Long's first operations. In the entire volume of papers before me relating to Long's first two or three operations, including the sworn statements of parties who were actually present, no mention is anywhere made of Wilhite. Moreover, not until years afterward does it seem to have occurred to Wilhite himself that he had any connection whatever with the discovery of anesthesia. When Dr. Long's case was being argued before Congress, he obtained from Wilhite a certificate (February 4, 1854) with these words: "I entered the office of Dr. C. W. Long, of Jefferson, Ga., in October, 1844, where I continued about eighteen months. Not long after I entered his office, and not later than 1845, I heard the said Dr. Long speak of having used sulfuric ether by inhalation, to prevent pain in surgical operations, he referring to a period of time before I entered his office." The remainder of the certificate states that he (Wilhite) had heard others speak of the operations, and he was under the impression that he had himself talked with the first patient upon whom an operation had been done. Between this certificate and the story as related to Sims, twenty-three years later, there seems to be an irreconcilable conflict.

Up to the time of Dr. Long's death, the relations between himself and Dr. Wilhite appear to have been very friendly. In his interview with Dr. Sims, in 1876, Wilhite said that "Long was the real and original discoverer of anesthesia, and believed he would be so acknowledged if all the facts in the case were fully set forth." When Sims was in correspondence with both of them during the preparation of his paper, Wilhite wrote Long,—

"ANDERSON, S. C., January 16, 1877.

"*Dr. C. W. Long:*

"Dear Doctor,—I have just received a letter from Dr. J. Marion Sims, of New York, stating that you will not write to him, or at least that he wrote to you about three weeks ago and had received no reply. If you don't do so soon it will be too late. He has been preparing an article for publication, and wants to place you right before the world. You have been apprised, I suppose, of the nature of the article. Why you have been connected with, and will be the leading spirit in the article, happened in this way: While I was in New York last summer at one of Dr. Sims's private operations, several prominent physicians being present, I happened to remark that I witnessed the first or second operation ever performed under an anesthetic. Every one said that I was mistaken, and particularly Dr. Sims. . . . After that I met Sims at his office and gave him such particulars as I could recollect of your first operation, and also urged your claims to the priority. He at once wrote you on the subject, and has since become very much interested in the matter.

"Now, doctor, it is but justice to you, as it is due the world, that you give Dr. Sims such information as he asks for at once, as he is going to all this trouble only to place the proper credit of this great discovery on the man who justly deserves it. I earnestly hope you will comply with the doctor's request as soon as possible. . . . As I have been the means of giving the investigation of this subject its present shape, I am exceedingly anxious that you should give all the information you can, that you may, and justly too, receive the credit of this great discovery. If you will act, it will certainly be so. Dr. Sims also wants a short history of your life, which don't fail to give.

"Hoping to hear from you, I remain yours, etc., P. A. WILHITE."

In reply to this, Long reminded Wilhite that he did not witness the operations, as stated, and asked him to send Sims a certificate similar in character to the one above quoted. Dr. Wilhite replied,—

"ANDERSON, S. C., January 27, 1877.

"*Dr. C. W. Long:*

"Dear Doctor,—Yours of the 22d is at hand, and I have also just received a letter from Dr. Sims, which I will answer to-day. In regard to the certificate you spoke about, it will not be necessary, I think, as Dr. Sims has my statement written out in full. He was very particular to get all the points and facts I could recollect. In my statement *I did make a mistake about my being present at the first or second operation, which mistake I will correct.* (Italics mine—L. B. G.)

"If you still think proper, I will send a certificate. Let me know, and I will give you any assistance in this great matter.

"Yours truly, P. A. WILHITE."

Sims's article appeared in May, 1877, and Long at once noticed the errors and the absence of the promised corrections. He requested Sims to correct the mistakes, but the latter replied that the "misplacement of a few names and dates would not alter the main facts in the case." He sailed for Europe in a few days, and the matter was dropped.

The above is sufficient to show, beyond the shadow of a doubt, that Dr. Long was the "real and original" discoverer of the anesthetic properties of ether, *and that he could not have received any assistance or suggestions whatever from young Wilhite.*

It is not material to the strength of Dr. Long's case whether the negro boy incident ever happened or not. However, there is no evidence to show that he knew anything of it until nearly forty years after it is said to have occurred. I have lately had an interview with Miss Fannie Long, to whom Dr. Long had often told and retold the circumstances relating to his discovery. In his later years she became thoroughly familiar with every detail of her father's claim, and at his death he confided to her keeping all the documentary evidence in his case. She tells me that the above story was related to Dr. Long by Dr. Wilhite himself, in the presence of several of the family, when Wilhite was on a visit to her father's house in the spring of 1877. After hearing it, Dr. Long replied, "Doctor, this is the first time I ever heard of it."

There is living near this city an old gentleman, who still preserves a clear recollection of the events of that period, and to him I am indebted for the following letter:

"EDGEWOOD, DEKALB COUNTY, GA., June 27, 1893.

"*Dr. L. B. Grandy:*

"Dear Doctor,—In response to your inquiries, I will state that I was intimately acquainted with Dr. C. W. Long, and was frequently with him after he located in Jefferson, Ga., in the summer of 1840. He often administered the vapor of ether to us young men of the village for the exhilarating effect produced, and he told me that he became acquainted with this property of ether while a medical student in Philadelphia. Upon one occasion, in the fall of 1841, I think, he remarked to me that he thought ether could be used to prevent pain in surgical operations, and that he intended to make the trial at his earliest opportunity. I moved to Athens January 20, 1842, and introduced the inhalation of ether among the young men in that place. Before this time the practice of thus taking ether was unknown in that section. At Dr. Long's request, I sent him some ether from Athens in the winter of 1842. Shortly afterward he came to Athens, and told me that he had operated successfully under the influence of the ether.

"These are the facts as I now remember them. Up to the time that I moved from Jefferson, Dr. Long did not have any students in his office. If ether had been employed in sport in the neighborhood of Athens previous to my introduction of it there, I never heard of it. In reaching the conclusion that ether might be used in surgery, I do not think Dr. Long received any outside assistance. In my opinion, the idea was original with him.

"Yours, very truly, "R. H. GOODMAN."

The circumstances which led to Dr. Long's first operation are thus described by himself, in a letter to Hon. D. L. Swain, LL.D., June 4, 1866:*

"In December, 1841, a company of young men were in my office, and requested me to prepare some nitrous-oxid gas for inhalation. I informed them that I did not have the necessary apparatus for making it, but that I had an article which would produce like exhilarating effects, and which I considered equally safe. They expressed a desire to inhale it, and it was administered that night to most of the company. They were so well pleased with the effects that it soon became fashionable to inhale the ether, and I noticed persons while under its influence receive injuries which were sufficient to produce pain, but on inquiring of them if they suffered any pain, they uniformly told me that they had not. I noticed one young man receive an injury of the ankle-joint which disabled him for several days, and he informed me that he did not feel the slightest pain until the effects of the ether had passed off. Observing these facts, I was led to believe that surgical operations might be performed without pain, and proposed to the gentleman on whom my first operation was done that if he would submit to the operation while etherized, I would charge nothing, or only a nominal fee, for operating."

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* Dr. Swain was the uncle of Dr. Long's wife, and at the time of this letter was president of the University of North Carolina.

This operation was for the removal of a tumor from the neck of James M. Venable, March 30, 1842. A second tumor was removed from the same patient June 6 following.* The last clause in the above letter will explain the following entry in Dr. Long's ledger:

1842. JAMES VENABLE.	
January 28—Sulfuric ether	$ .25
March 30—Ether and excising tumor	2.00
May 13—Sulfuric ether	.25
June 6—Excising tumor	2.00

The details of that first operation under ether have been published by both Dr. Long and Dr. Sims. Concerning the subsequent operations, not much need be said.

On *July* 3, 1842, Dr. Long amputated the toe of a negro boy for disease.

On *September* 9, 1843, he extirpated a tumor from the head of Mary Vincent, of Jackson, Ga.

On *January* 8, 1845, he amputated two fingers of a negro boy. The certificates of two witnesses to this operation state that the first finger was removed under the anesthetic, and that the boy experienced no pain; that the second was removed without ether, and was very painful. It occurs to me that Dr. Long's conduct in this case proceeded either from the fear of keeping the patient under the anesthetic too long, or from a desire to test the action of the ether. The latter view is made plausible from a statement of Long lower down.

If Dr. Long had promptly made public the results of his work, American medicine would have been spared the most tragically interesting chapter in its history. But, under the circumstances, he pursued a course both natural and commendable, and his reasons, as given by himself, were entirely cogent. He knew that he was the first to make the discovery, and he anticipated no controversy. His operations had all been of a minor character, and he only waited for an opportunity to test his anesthetic in capital surgery. But cases of heroic surgery were not common in those days in the practice of a young physician, in a thinly-settled community one hundred and thirty miles from the nearest railroad. As far as it went, his work was well known in the small sphere in which he moved. Before me are several certificates—three of them from physicians who were prominent in that section at that time—to the effect that "Dr. Long's operations were public and notorious in and near Jefferson, Jackson county, in the year 1842;" that he "made no attempt to conceal the character of the article inhaled, nor made any request that the results of his operations be kept secret."

Dr. Long's delay in going into print with his cases is thus explained by himself:†

"I was anxious, before making my publication, to try etherization in a sufficient number of cases to fully satisfy my mind that anesthesia was produced by the ether, and was not the effect of the imagination, or owing to any peculiar insusceptibility to pain in the persons experimented on. At the time I was experimenting with ether, there were physicians high in authority, and of justly distinguished character, who were the advocates of mesmerism, and recommended the induction of the mesmeric state as adequate to prevent pain in surgical operations.* Notwithstanding thus sanctioned, I was an unbeliever in the science, and of the opinion that if the mesmeric state could be produced at all, it was only in those of 'strong imaginations and weak minds,' and was to be ascribed solely to the workings of the patient's imagination. Entertaining this opinion, I was the more particular in my experiments in etherization."

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*These operations were done in the presence of Jas. E. Hayes, A. T. Thurmond, E. S. Rawls, afterward a practicing physician, and perhaps others. Certificates of these gentlemen are before me, besides also those of Venable's family.—L. B. G.

† Extract from an unpublished (?) paper read before the Medical Society ot Georgia, April, 1853.

In the mean time, Wells and Jackson and Morton were at work. With some assistance from one another, they arrived successively at the anesthetic properties of nitrous-oxid gas and sulfuric ether; and Morton, with an eye single to glory and business, secured a patent on ether under the name of *Letheon.* In the Massachusetts General Hospital, Boston, October 16, 1846, Morton administered his "letheon" to a patient for Dr. J. C. Warren, and a tumor of the neck was successfully removed. Other operations followed in quick succession by the hospital staff. They were described in the *Boston Medical and Surgical Journal*, November, 1846, by Dr. Henry J. Bigelow. October 27, 1846, Jackson and Morton published their letters patent, announcing the discovery of "letheon" as an anesthetic; but their "letheon" was nothing more nor less than sulfuric ether.

Now began the celebrated "Ether Controversy," which I will pass over rapidly. Wells claimed the honor for himself, but having failed, both at home and abroad, to receive the recognition he sought, he ended his life by suicide, January 14, 1848.

When Dr. Long saw that he was anticipated in the matter of publication, he began at once to collect the evidence in proof of his own work. He obtained the affidavits of those operated upon, with dates, the sworn statements of witnesses and of those who knew of the operations, and his first article appeared, with some of these certificates, in the *Southern Medical and Surgical Journal* (Augusta, Ga.), December, 1849.

In 1852, a bill was introduced in Congress to purchase Morton's patent for $100,000. This was opposed by Dr. Charles T. Jackson and the friends of Wells. Dr. Long's claims were also presented, and Sims says they were formidable enough to block the movements of Morton to get the appropriation. In 1854, Jackson made a visit to Long in Athens, and having satisfied himself as to the latter's priority in the use of ether, proposed to him (Long) to lay their claims conjointly before Congress as the real discoverers of anesthesia. At the interview between them Judge Andrews, of Madison, Ga., was present by Dr. Long's request. Dr. Long declined all of Jackson's suggestions, and instructed Senator Dawson, of Georgia, to make no compromise, but to place his claims solely on their merits. The matter drifted along with true congressional slowness until it was finally lost in the preparations for war. Morton was greatly disappointed at not receiving the reward from Congress. In New York, July 15, 1868, having fretted himself into a congestion of the brain, he drove furiously up Broadway and leaped from his buggy near Central Park. He was taken up insensible and carried to St. Luke's Hospital, where he died an hour later. It was not long before Jackson was committed to an asylum, hopelessly insane. After some years of confinement he died, August 28, 1880.

The ether controversy was never reopened. Dr. Long continued to practice his profession in Athens, and enjoyed a good patronage. Of course he regretted not having received the recognition he was sure he deserved, but his life was not saddened thereby. In regard to his discovery of anesthesia, he had often said, "My only wish about it is to be regarded as a benefactor of my race." While on a visit to a patient, June 15, 1878, he was stricken with paralysis, and, without regaining consciousness, died the next day. The Georgia Legislature has agreed to place his statue in the National Gallery of Statues in Washington. Dr. Long combined excellently the noblest qualities of the physician with the highest attributes of the gentleman. He knew that the credit of the discovery was properly his ; but through all the long controversy he was content to rest his claims on their merits alone, and conducted his case with dignity and honor. He claimed nothing for himself that was not his ; his character was known of all men, and was above reproach ; he was modest, honest, and truthful to the last degree ; and he "kept the covenant of his heart's true life till his days were numbered."

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* Dr. Long here refers probably to Dr. Gibbs, of South Carolina, who, at that time, was especially prominent among the class of physicians above alluded to. He, and others, claimed to have "witnessed operations on patients mesmerized, and declared that mesmerism was the *ne plus ultra* needed to kill pain in surgical operations."—L. B. G.]

Paul found in his travels many altars erected to as many gods, and in Athens another, "To the Unknown God." So the tourist can see, in Hartford, Conn., a bronze statue erected to the memory of Horace Wells ; in Mt. Auburn Cemetery, Boston, a marble shaft to W. T. G. Morton ; in Paris, a life-size marble statue of Crawford W. Long ; and in Boston, a monument of white marble dedicated "To the Discoverer of Anesthesia." It bears no name, but to one familiar with history it recalls the sad story of hopes that were disappointed, ambitions that were defeated, and lives that were lost, through their connection with the most humane and beneficent discovery of modern times.

Only one word more. Dr. Long's priority in the use of ether is beyond question. His discovery was the logical outcome of certain observed phenomena, and he proceeded to develop it in a scientific way in order to make assurance doubly sure. In the mean time, others less philanthropic gave a patented name to a common article, and, in some haste, announced a great "invention," which, later, they tried to sell for money. But, thanks to Dr. Sims's clear presentation of the evidence, the medical profession generally, I believe, have recognized the precedence of Dr. Long's discovery.

It is a little surprising, therefore, that the author of a popular text-book on surgery should say, "I hope I may be pardoned for saying that the evidence in Dr. Long's favor seems to me quite inconclusive." I hope I may be pardoned for reminding him that the blindest persons *are those who will not see.*

A late writer in the *Medical Record* (January 7, 1893) has read history to such little purpose as actually to state that Dr. Long himself never claimed to have "demonstrated painless surgery by etherization." Will the gentleman from New England kindly tell us, then, what was Dr. Long's object in going before Congress with his case when he saw that others were claiming the credit of the discovery? He might also explain Dr. Long's refusal to accept Dr. Jackson's proposition, and his instructions to Senator Dawson, above referred to.

People, and especially the inhabitants of those cities and sections where new discoveries make late impressions, part with their long-cherished opinions with great reluctance, and then only when the evidence becomes such as to convince the most unwilling. The present instance will be no exception. It is only to be expected, therefore, that there will remain some persons whose understandings will not be enlightened.—*Luther B. Grandy, M.D., in Virginia Medical Monthly.*

DENTISTRY IN TASMANIA.—New regulations have been approved by the governor under which the qualifications of those who desire to be registered according to the provisions of the dentists acts of the colony shall require to be equal to those now obtaining in England. Thus they will require to pass a preliminary examination, serve an apprenticeship of four years, and attend lectures and hospital practice for two years. The rights of those who were indentured apprentices before the passing of the new regulations are reserved, and they will be required to pass only a modified examination. All who receive the diploma must sign a non-advertising declaration.—*Chemist and Druggist.*

FORMALIN : AN IDEAL HARMLESS GERMICIDE.—The antibacterial action of formic aldehyde was studied by Löw in 1886, and subsequently by Aronson, Berlioz, and Frillat. Formaldehyde is known as a gas under normal conditions of temperature and pressure. It is readily soluble in water, and such a solution of forty per cent. strength is put forward under the name of formalin. This liquid mixes in all proportions with water, and any required dilution can be readily prepared. Thus, for instance, by mixing one part of formalin with forty parts of water, forty-one parts of a one per cent. solution are at once obtained. Even at ordinary temperatures formalin gives off gaseous ormic aldehyde, and the evolution of gas is, of course, accelerated by application of heat. Exhaustive and numerous experiments on the bactericidal power of formalin have been carried out by Dr. J. Stahl, of Berlin, who found that it is equal in germicidal power to sublimate, and under certain conditions superior where albuminoid solutions are concerned. Great importance is attached to the applicability of the ideal antiseptic in gaseous or vaporous form, as only in this way can we conveniently disinfect large rooms and more delicate articles in closed apparatus. The experiments showed that 2.5 volume per cent. of formalin in the air destroyed all micro-organisms in a quarter of an hour. The interesting observations were made early in the examination of the properties of formalin, that, when allowed to evaporate in the presence of wool, gauze bandages, or other dressing-material, the vapors condensed upon the fabrics in solid form (paraformalin) and so disinfected them. On evaporating again from the solid form, paraformalin was disassociated into formalin vapor, and exerted an antiseptic influence upon its surroundings. Hence dressing-materials treated with formalin are not only perfectly sterile, but can be immediately used as antiseptic dressing. Kaolin blocks soaked in formalin have been brought out under the name of formalith, and designed for placing in closed vessels, with dressing-materials, which by this means can be kept perfectly aseptic. Another series of experiments was designed with the view of determining the microbicide power of the preparation when sprayed upon paper and textile fabrics. Dr. Stahl found that for the disinfection of the walls, ceiling, and floor of a room twenty-three feet square and thirteen feet high not more than three pints of the solution, or about six drachms of the forty per cent. formalin, would be required. For the disinfection of a room in the Lazarus Hospital (Berlin) of about the size specified, about four and a half pints of a two per cent. dilute solution was used from two small spray apparatuses, the time occupied in the process being half an hour.

Aronson, Berlioz, and Frillat have determined that formic aldehyde is relatively non-poisonous. When brought into contact with the animal skin, undiluted formalin exerts a kind of tanning effect, making it impermeable, and finally bringing about its necrosis. This action depends upon the property which formalin possesses of readily penetrating living and dead animal tissue and forming with it a sort of combination. The tissue is destroyed without suppuration or formation of a sore. The application of this action of formalin to surgery is obvious. Probably the preparation will be useful as an external application to lupus or cancer, or, in very dilute solution (up to one-half per cent.), for the irrigation of cavities. It may also prove of value for the removal of diseased growths on the epidermis or the mucous membrane.

Summing up the results of all these experiments, the properties of formalin may be expressed as follows: 1. It has an extraordinarily active microbicide power similar to that of sublimate. 2. It is comparatively non-poisonous. 3. It attacks only the substance of the contagious material, leaving intact the articles treated, whether of organic or inorganic nature. 4. It is very readily employed under all circumstances, either in liquid or gaseous form.

It is a marked advantage of the vapor of formalin that its specific gravity closely approximates to that of the air, so that there is no difficulty in keeping the atmosphere of an inclosed space uniformly impregnated with formalin vapor. In gaseous form the preparation promises to do good service in the dry disinfection of more delicate articles in closed vessels, as well as of furs, dressing-material, etc. Formalin is manufactured by the Chemische Fabrik auf Actien, formerly E. Schering, of Berlin, the agents in the United States being Messrs. Schering & Glatz, of New York city.—*Med. Bulletin.*

THE USE OF OIL OF CINNAMON AS AN ANTISEPTIC IN SURGERY.—In the *Journal de Médecine et de Chirurgie pratiques*, 1893, No. 11, Dr. Just Championnière extols the antiseptic value of oil of cinnamon. The attention of the author was first called to the antiseptic properties of the essential oils by the work of M. Chamberland, in 1887. The ideal antiseptic should be efficient and yet be free from irritating qualities; it should not be poisonous nor possess a disagreeable odor. After numerous experiments with the various volatile oils, Championnière found that the oil of cinnamon was the most active, very closely approaching corrosive sublimate as a microbicide.

Considerable difficulty was experienced in obtaining a preparation of the oil free from irritating properties. When combined with rétinol, however, it was found to be free from this objection. The following formulæ have proven quite satisfactory:

℞—Rétinol, 75 grammes;
Sterilized wax sufficient to make
of a proper consistence;
Cinnamon oil, 1 gramme; or
℞—Rétinol, 75 grammes;
Sterilized wax, 25 grammes;
Cinnamon oil, 1 gramme;
Beta-naphthol, 1 gramme.

The oil must have been recently redistilled. The preparation is spread on lint and applied to the wound. The author has employed this preparation in cases of laparotomy, radical cure of hernia, excision of the breast, etc., and he claims that extensive wounds, even those which are drained, may be kept in a very satisfactory state of antisepsis.—*Amer. Jour. Med. Sci.*

NAPHTHOL-ARISTOL is an iodin derivative of beta-naphthol, prepared by a process similar to that yielding aristol. It is described as "containing two iodin atoms in the molecule, one of which must necessarily be attached direct to a carbon atom in a stable position." If the presumption that this product is therapeutically identical with aristol proves true, we will have in this substance a superior substitute for aristol, because it is more stable, has fewer incompatibles, and the excellent co-operative effect of beta-naphthol will enhance its remedial value.—*Amer. Therapist.*

DEATH FROM THE USE OF PENTAL.—Lick (*Deut. Med. Woch.* and *Rev. Gén. de Clin. et de Thérap.*, September, 1893) reports two fatal cases of poisoning by pental.

A young girl, whose necrosed finger it was necessary to amputate, inhaled ten grammes of pental from a sponge inhaler. During the anesthesia dyspnœa, cyanosis, and cardiac failure suddenly developed. Artificial respiration and tracheotomy were of no avail, so that death soon followed.

The second case was a girl, aged eighteen, anesthetized by pental for the injection of iodoform into the hip. She had been previously anesthetized by chloroform and ethyl bromid. On removing the inhaler ten minutes after the inhalation had begun, dyspnœa, spasm of the masseters, stertorous breathing, and cyanosis developed. Injections of ether, artificial respiration, injections of salt water and tracheotomy were futile; the patient perished.

In these cases the accident could not be attributed to asphyxia, but directly to the toxic properties of the pental.—*Univ. Med. Mag.*

PENTAL AS AN ANESTHETIC.—It is astounding what conflicting reports appear as to the employment of pental as an anesthetic, and although from time to time unpleasant and even fatal consequences are attributed to its use, as is the case with all anesthetics, yet the fact that pental always finds a host of partisans, especially among dental surgeons, who maintain that they can employ it with comparative safety and without the disagreeable after-symptoms that accompany most anesthetics, leads one to suppose that want of success is as much due to inexperienced manipulation or accidental circumstances as to any inherent defects in the compound. In a paper by a lady doctor, Fräulein Kleindienst, a new development presents itself. Although the author concurs with Professor Holländer and others as to the action of pental on frogs and rabbits, and as to the happy results obtained in minor operations, having even administered it with success in anesthesia lasting forty-eight minutes without any untoward symptoms, yet she condemns its use because she believes to have observed an injurious action on the kidneys, having detected in a few cases albumin and blood in the urine after pental-narcosis. This evidence being so entirely new requires support before it can be accepted, especially as in two cases in which details are given, it appears that zinc chlorid injections were made during the operation, and zinc chlorid is known to injuriously affect the kidneys.

The direct consequence of this communication has been that Dr. Bauchwitz has made a special series of experiments to determine the truth of the appearance of abnormalities in the urine after pental-narcosis. The results of his examination of the urine, both of rabbits and human beings, are completely negative, nor was he able to detect any organic changes in the kidneys of rabbits killed by overdoses of pental. In fact, in his experience in operations on the teeth and mouth, pental is at present the best anesthetic we possess for short operations, in consideration of its reliability and the general condition of the patient after the operation.—*Notes on New Remedies.*

LOCAL ANESTHESIA FROM ARISTOL.—Several observers have called attention to the soothing effects of aristol when applied to painful exposed surfaces. This has been especially noted when aristol has been employed as a dressing for burns, bed-sores, and blisters, or for irritating ulcers. At the same time, the analgesic action of aristol does not interfere with the strong healing power necessary to a prompt cicatrization of denuded areas, while it seems to favor the growth of normal granulating surfaces. It is not easy to say just how far the power of aristol as a local anesthetic may be made useful in the operations of minor surgery, but some recent experiments point to a probable new field of usefulness for this remedy in the direction cited. The following paragraph from the *Kansas Medical Journal* is quite significant as showing that the advantages of aristol as an analgesic have not passed unobserved: Dr. S. M. Riggs has made some interesting experiments in the use of aristol as a local anesthetic. A hypodermic injection of a solution in glycerol was made on a kitten, with the result of complete local anesthesia. The animal made no resistance to a cutting operation, and was apparently unaware of being injured. The advantages of using as a local anesthetic the same drug which was afterward to be applied to the operation wound as a cicatrisant would of course be very important.—*Journ. Amer. Med. Assoc.*

THE COMPARATIVE ACTION OF IODOFORM ON STAPHYLOCOCCI and on the elements entering into the composition of blood has been investigated by Dr. E. Maurel (*Bull. Gén. de Thérap.*, September, 1893, p. 241), by (1) submitting the blood elements to the action of a staphylococcus culture on gelose; (2) submitting the same elements to the action of iodoform; (3) submitting staphylococcus to the action of iodoform; and (4) allowing iodoform to act simultaneously on that micrococcus and on the blood elements. The leucocytes of human blood absorb, at body temperature, the staphylococci of a gelose culture, but succumb to that absorption within two hours; the blood-corpuscles separate, but dissolve and disappear after fifteen hours; and fibrin, which is at first precipitated, is redissolved after twenty-four hours. Iodoform in doses varying from 10 cgm. to 2.50 gm. per liter of blood has no toxic action on the leucocytes; on the contrary, their activity seems to increase proportionately to the dose employed. The author found that iodoform has no apparent action on the reproductivity of staphylococcus, but lessens its *virulence* against leucocytes when blood is submitted to its presence at the same time. From these results the author draws the conclusions that three distinct properties must be recognized in various microbes, but especially in staphylococcus,—*virulence*, *reproductivity*, and *survivency*, and that the efficiency of iodoform against staphylococci, which has been demonstrated by clinical practice, is due to its double action in increasing the activity of the leucocytes, and in diminishing the virulence of the staphylococcus.—*Amer. Journ. Pharmacy.*

PHENOSALYL, a clear, syrupy liquid, consists of a mixture of carbolic, salicylic, and benzoic acids melted together and dissolved in lactic acid. The solution partially crystallizes at low temperatures, but if a small quantity of glycerol be added a clear solution is formed which does not again crystallize, is easily soluble in warm water, to the extent of seven per cent. in cold water, and very soluble in alcohol and ether. Fraipont of Lüttich has employed phenosalyl in one hundred major operations and in sixty-eight confinements, and expresses himself to be very well satisfied. In the conclusion of his communication he summarizes the advantages of phenosalyl over other antiseptics as follows: Easy solubility in water, no danger of toxic symptoms, a pleasant and not persistent odor, which does not cling about the hands and clothes. The solutions have no corrosive action on the skin; the mucous membranes remain smooth and slippery, and are not dried up, as is the case after washing with carbolic acid and corrosive sublimate. Phenosalyl is not only valuable as a disinfectant, but has a specific action upon the inflamed mucous membranes, stimulating the regeneration processes.—*Med. Standard.*

THE PRESERVATION OF SOLUTION OF SUBLIMATE.—Schill recommends the employment of acetic acid in the following proportions:

Mercury bichlorid	1
Acetic acid	5
Water	94

This solution exposed to the light will not give rise to any of the subchlorid. Johnson, of Liverpool, prefers to pass free chlorin into the solution. It may be noted that solutions of sublimate only decompose very slightly when exposed to the light if they are preserved in well-closed bottles made of a glass free from alkali. The turbidity occurring in these mercurial solutions appears to be, in part at least, due to traces of ammonia gas in the laboratory, and Johnson's process provides a trace of free HCl, which neutralizes this ammonia. It may be noticed that the amount of acetic acid suggested by Schill is too much. The merest trace of acids, even the hydrocyanic acid in cherry laurel water, will effectually prevent the precipitation.—*Repertoire de Pharmacie.*

LYSOL.—Lysol belongs to the group known as cresols, and is a coal-tar product, hence its close relation to carbolic acid. The cresols are, as a rule, practically insoluble. However, when the question of solubility among the different members of the group came into consideration, and the matter put to a practical test, we find that lysol, in a soluble form, is obtained by dissolving in fat, and afterward saponifying with alcohol, that fraction of tar oil which boils between 190° and 200° C. It is a brown, clear liquid, possessing a creasote-like odor, forming clear, compatible mixtures with water, alcohol, benzine, chloroform, and glycerol.—*Notes on New Remedies.*

CHEAP TOOTH-BRUSHES DANGEROUS.—An operation for appendicitis upon a patient living in this state revealed the fact that the disorder was due to the presence of tooth-brush bristles. "Cheap tooth-brushes," remarked the Albany surgeon who had charge of the case, "are responsible for many obscure throat, stomach, and intestinal ailments. The bristles are only glued on, and come off by the half-dozen when wet and brought in contact with the teeth."

This is a good argument to use at the counter in discouraging the sale of the cheap and, as the above item shows, dangerous tooth-brushes with which the fancy-goods trade is flooded. It were better for the user to pay fifteen or twenty cents more for a brush well made than to risk the dangers attending the use of the cheaper makeshift.—*American Druggist.*

SHOULD DOCTORS CHARGE DENTISTS? is a question the medical journals are trying to decide. The boot might be wisely put on the other foot: Should dentists charge doctors? If a dentist is a graduate physician, the "courtesies of the profession" should certainly be accorded each other by both physician and dentist—at least so far as service and advice. Why not just the same if he is not an M.D.? However, it wouldn't be advisable, as has been seriously suggested, to attempt making the doctors' drugs offset the dentists' gold plates and gold fillings. Hardly!—*Med. News.*

ANTIDOTE FOR CARBOLIC ACID.—An Italian tailor swallowed by mistake thirty grammes of carbolic acid. Dr. Moreit, of Ancona, using a rubber catheter, immediately introduced by slow degrees into the patient's stomach a strong solution of sulfate of soda, which forms with carbolic acid a harmless mixture. In an hour's time the patient, who had been in a most critical condition, began to revive. Inhalations of ammonia were then used to hasten up the process, and little by little the poisoned man rallied so that an emetic, followed by a dose of lime-water, finished the cure.—*Med. Times.*

HINTS, QUERIES, AND COMMENTS.

To the Editor of the Dental Cosmos :

Sir,—Will you in the next issue correct an error in the list of Dental Commissioners of Connecticut? Dr. McManus was appointed, but did not accept. Another error can be corrected by saying that the law went into operation May 25, 1893 (not July 1). George C. Parmele, *Recorder*.

Hartford, December 6, 1893.

To the Editor of the Dental Cosmos :

Sir,—May I ask those of the Cosmos readers who are interested in dental nomenclature if there is any reason why the term air-chamber should be longer employed to designate the cavity formed in the palatal surface of upper dentures to assist in securing adhesion of the plate by atmospheric pressure? It seems to be a misnomer, for if it fulfills its function the air is exhausted from it by suction in the act of adjusting the plate, and a vacuum more or less complete results. The terms suction-cavity and vacuum chamber are used in the "American System of Dentistry" to describe this feature of the plate, and appear to correctly represent the case. The term air-chamber is, however, frequently used by dentists, and if incorrect, as it appears to be, should be dispensed with. Can we not have an expression of the views of the authorities on dental nomenclature upon this point? F. T. J.

To the Editor of the Dental Cosmos :

Sir,—Any member of the dental fraternity having a fair dental or medical training, and who is a thinking, conscientious member, must have read with interest Dr. Baldwin's writing on the "Dental Education of the Public," in the December issue of the Cosmos. This question of education of the public is a serious one, and worthy of deep thought. The recognized teaching of the present day is to save the natural teeth if possible. Is this always a wise course in a practice of people with little knowledge of the good derived from saving the natural organs? My answer in some cases would be in the negative. A student fresh from college is apt to endeavor to save many teeth which later in practice he will condemn to the forceps, and it is mainly because of this want of education of his patients. Any young man who wishes to have a lucrative practice must not make failures enough to counteract the effect of his successes. A failure getting to the ears of the public will overcome in results many a success. Self-preservation has well been said to be the first law of nature. It is not policy to try and save the teeth of people who think that if trouble ensues after an operation, it is always the fault of the operator. Who has not heard this hackneyed expression, "Dr. So and So killed the nerve in this tooth, and it now aches, and he of course could not have done it right, or it would not now ache"? Above all, educate the public in the distinction between a live and a pulpless tooth, but cease using the word "dead," for the common meaning to the people is that this word means a something that can't trouble again.

An idea of which I have thought is the education of our rising generation through the agency of the public schools. In all of the higher grammar grades, and in some high schools, the scholars are taught rudimentary physiology and hygiene. The subject of the teeth is but meagerly treated. Let a commission be appointed to prepare a practical treatise on the subject of the teeth, and have the same inserted in the authorized text-books on physiology and hygiene used by the various schools throughout the country. How can greater benefits be derived, both to humanity and the dental profession? Any author of a text-book used in the public schools would be only too glad to avail himself of such a treatise if it would benefit his work. If this can be accomplished, it at least will give the future generations, if not the present one, education which we desire they should have. A. J. FLANAGAN, D.D.S.

SPRINGFIELD, MASS.

NITROUS OXID AS AN ANESTHETIC IN GENERAL SURGERY.—F. L. Macdonald, M.D., of Washington, D. C., in the *Southern Journal of Homœopathy* for November, 1893, gives an interesting account of his experience with nitrous oxid as an anesthetic in general surgery. It has been too generally believed that nitrous oxid, because of its transient effects, was only applicable as an anesthetic agent for operations of short duration, and this belief has greatly limited its field of usefulness in general surgery. Very few general surgeons make use of it at all, and these almost invariably administer it for minor operations occupying but a few moments' time.

The acknowledged superior safety of nitrous oxid as compared with other agents for the same purpose should greatly increase its use in surgery if the fact were generally known that complete anesthesia may be maintained with this agent for an indefinite period when intelligently administered. Its transient effect is rather apparent than real, for, as Macdonald says, "The idea of the transientness of the gas anesthesia is probably due to the fact that its use is confined almost solely to the extraction of teeth, a procedure which *necessitates the removal of the inhaler*, and sensibility *of course rapidly ensues;* and I have endeavored to find out some objections to the renewal of inhalations, but without success. It is simply the *custom not to do so.* Now under the same circumstances ether and chloroform would likewise be transient in their effects, so that the wonder is that gas has not long ago been applied in general surgery." Ten cases are reported by Dr. Macdonald in which nitrous oxid was the anesthetic used. The operations included a wide range of procedures, from the simple opening and evacuation of a vulvar abscess to amputation of the thigh at about the middle of the femoral shaft. In all cases complete surgical anesthesia was maintained for lengths of time varying from ten to forty minutes without unpleasant after-effects. He found that it was possible to avoid cyanosis, and to confine the action of the gas to what he terms the second stage,—*i.e.*, complete anesthesia without cyanosis or asphyxia. He says, further, "The ability to exhibit the gas in full quantity at the beginning without producing distress, the rapidity of its action in overcoming sensibility, and its equally rapid elimination as soon as administration is suspended, are features that are particularly characteristic of this anesthetic and absent in the others. Another fact is that nitrous oxid practically defies the law of stimulation and depression. That is to say, stimulation, whatever its degree, is followed by depression in proportion to the stimulation (exhilaration or exaltation) preceding it. This is a regretful truth as regards ether or chloroform, but cannot be said of gas, and hence is removed one of the strongest factors in the production of surgical shock." He takes positive exception to the conclusions of Turnbull in reference to the limited range of nitrous oxid, on the ground that the reasons which that authority gives for his conclusions that the range of gas is limited, are the very reasons which have led him (Macdonald) to conclude that its range is almost limitless. We regret that a full description of his technique in administering the gas for prolonged anesthesia was not included in the paper.

COMBINATION DENTURES, DEVISED BY DR. ROBERT WUNSCHE, ANNABERG, GERMANY.—The illustrations of some completed combination dentures (Figs. 1 and 2) exhibit the result of combining a perforated metal plate with vulcanized rubber or gutta-percha to form a light, stiff denture having the novel appearance of a pleasing reticulate metallic structure with vulcanite filling the coned interstices. The thin perforated gold, aluminum, or victoria metal plate is supplied for use by the dental dealers. It has regular coned holes that make the perforate plate resemble metal net-work, the wider mouths of the openings being all on one side of the plate, and designed to both stiffen the reticulum and retain the associated vulcanite of the denture.

In every case it is desirable that two impressions should be taken, in order that the better of the two may be chosen, and any casual defects be corrected by comparison with the other.

At whatever inconvenience to patient or practitioner, a duplicate impression in plaster or modelling compound should be obtained to insure the close fit and utility of the subsequent denture. In combination work the better plaster model, No. 1, is reserved for the vulcanizing process; and from model No. 2 (which may be a second plaster cast from the original impression or the palatal portion of it), a counter-cast of the tongue side or palatal surface is taken to serve as a die for shaping the metal plate.

FIG. 1.

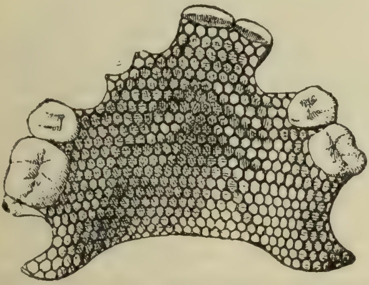
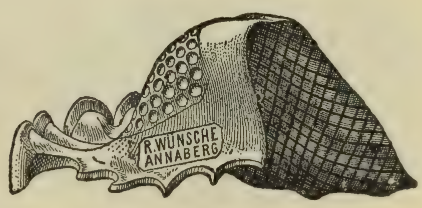


FIG. 2.



The counter-cast is best obtained by first burnishing onto model No. 2 a thin tea-lead, or pattern-tin plate, over which (and also the oiled plaster surface exposed) the thick-mixed plaster can be poured to form the counter-cast. When separated, the tin plate is to be flattened and be laid on the combination plate as a pattern for cutting an approximation to the size and shape of the perforate-blank. This blank is then heated slightly (remembering the low melting-point of aluminum when that metal is used), and pressed gently with the fingers onto the No. 2 model, over which has first been laid a piece of thin, soft, wet muslin (like that which separates the rubber sheets, and which has been washed to remove the starch) to keep the plaster out of the perforations, the smaller mouths of which lie next the muslin. Another piece of wet muslin is laid on the plate, and with the counter model gentle hand-pressure is made to partially conform the plate. This plate is then annealed, put between the wet muslins on the No. 2 model, and, with the counter-die in place, is put under the screw-press and softly pressed to shape. The case is then opened, closely cut to fit margins, annealed, replaced, and tightly pressed into place. Observing due care and caution to prevent and overcome any tendency to wrinkle, a smooth nearly conforming plate may be thus made to fit the deepest vault or irregular ridge.

If a vacuum chamber is contemplated, that must be provided for as usual in the plaster models. If the Speyer-Former suction surface—shown in Fig. 2—is purposed, a suitable piece of the stamped sheet-metal must be placed on No. 2 model; the cup-mouths toward the model, and pressed by the counter-die into place and shape before proceeding to make the combination plate as previously described

Model No. 1 having been placed in the articulator after obtaining the bite as usual, a very thin wax plate is put on, the combination plate warmed and neatly pressed into place so that the wax will come through the perforations and by nice manipulation be made flush with the metal surface, which must not be covered with wax.

The flasking and vulcanizing is done as usual, excepting the time, which is lengthened twenty minutes, equal to seventy minutes, to make a hard vulcanite that strengthens the reticulate metal, and with it forms a combination plate of remarkable stiffness and strength, as well as of a pleasing appearance when pink rubber is used, although the black rubber makes a somewhat stronger plate.

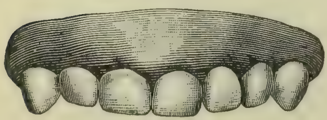
For partial dentures having isolated teeth, as two laterals for example, the perforated metal is of great advantage in strengthening the thin isthmus which connects each artificial lateral with the plate.

In every case the finishing process should remove from the palatal or lingual surface only the vulcanite that happens to overlay the metal, which is not to be scraped, but merely polished with its inclosed vulcanite. In fact, when properly modeled, the finishing is but the work of a few minutes, and the resulting light, thin, pretty plate is sure to satisfy both the appreciative dentist and his patient, especially if the gold combination plate has been employed.—W. S. H.

Some Irregularities of the First Dentition.—Irregularities of the teeth and their alveoli other than those attendant upon cleft palate and the syphilitic impress are held by most writers, I believe, to develop only with the second set of teeth. During my practice I have observed cases of irregularity in the deciduous teeth and arches, some of which may be worth recording, and these it would seem can hardly come under either of these heads.

A mouth with five superior incisors (Fig. 1), a supernumerary lateral, is, perhaps, of a more curious interest than any other. Does it point to a reversion of type, or evolution? Or is it a mere aberration of nature? If an aberration, will nature perpetuate it, or correct it at the first opportunity by producing the normal number of permanent incisors? This last query I hoped to be able to answer by keeping the child under observation till the permanent teeth came, but unfortunately lost sight of her.

Fig. 1.



Figs. 2 and 3 are models from the mouth of a healthy, intelligent, bright boy, who prides himself more on his muscle than on his intellect; is above the average in both. There is a well-marked "saddle-shaped" deformity, with prominence of oral alveoli between the cuspids, and with the maxillaries or their processes deflected to the right. The lower jaw is prognathous; all the teeth except the incisors closing outside of the upper ones, the laterals occluding on the cutting-edges. The boy is one of seven fine, healthy children. All of the others, with one exception, have good arches, the most of them very fine ones. One has the prominent oral alveoli and incisors, but the occlusion of the other teeth is perfect and the arch good. There is a history of rubber-nipple sucking, but the other six children were allowed to form this same habit, so it would seem that could hardly account for the deformity. The parents are healthy, the mother unusually so, with fine arches and teeth, and no history of such deformity in her family so far as I can learn. The father is an army officer, whose mouth I have never seen, thus cannot tell what part heredity may play from his side of the family. There is no history of unusual prenatal conditions that I can get, nor serious sickness in infancy. The boy is a mouth-breather. Is that the solution? or is it a concomitant only, and due to the same causes that produced the oral deformities?

By closer observation of the deciduous arches by the profession at large, so as to detect any deviation from the normal, and what influence these may have on the permanent arches and teeth,—whether they are preserved, corrected, or aggravated in the permanent,—it would soon be possible, by recording all such observations, to know how much of the irregularities of the permanent teeth and their arches is due to conditions existing prior to the development of the second teeth, and then, perhaps, what these conditions are; if not, how to obviate or correct them.—J. W. FOREMAN, Asheville, N. C.

FIG. 2.

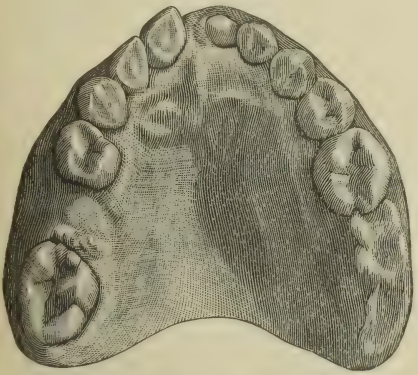
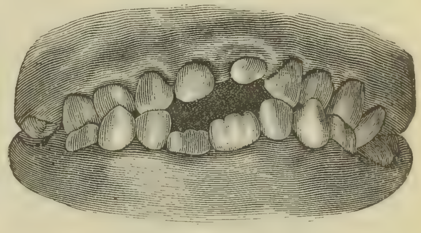


FIG. 3.



DENTAL LEGISLATION.—In the September (1893) number of the DENTAL COSMOS, page 1084, I read a most excellent resolution formed by the National Association of Dental Examiners at its session in Chicago. It reads thus: "*Resolved*, That it is the sense of the National Association of Dental Examiners, that when a member of the dental profession presents a certificate of registration from a state board of dental examiners, duly created by law, that the same should entitle the holder of such certificate to registration without an additional examination in any state of the union having a law to regulate the practice of dentistry;" and the amendment of Dr. C. Stoddard Smith is a most excellent one: "*Provided* such certificate was obtained on examination."

I am glad that the dental law is getting on a unit basis, for "Where there is unity there is strength." I read to-day in the *Items of Interest*, from the pen of Dr. D. D. Atkinson, that "when a person shall have obtained a license from a state board, he should then be admitted to practice in any state without further examination." Further he says, "A person who is really competent to practice in one state is equally so in any other state." I agree with the doctor, provided the person has obtained a certificate on examination from a state board "duly created by law," for, as he says, "Dental laws, like all others, are not retroactive, and as, in many states, newly created boards are required to license all who are practicing at the time of the enactment of the law, regardless of fitness or qualification, it is clear that a state license, in itself, is not evidence that a person is really competent to practice dentistry, and it would not be proper to require other states to accept him on that ground." Now it is clear that the amendment of Dr. C. S. Smith would govern the case above mentioned by Dr. D. D. Atkinson.—F. CHILTON HODGKIN, D.D.S.

I HAVE a peculiar case, new to me, and I would like some information through the DENTAL COSMOS, if any one should be interested enough to give it. Boy, F. K., seven years old. Left inferior first bicuspid almost fully erupted, well developed, nearly in normal position, quite yellow and loose. Should anything be done? Other teeth normal; health always been good.—M. C. MARSHALL, Little Rock, Ark.

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A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a Thesis.

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PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING NOVEMBER, 1893.

November 7.—No. 507,980, to ADDISEN D. BARRETT. Vulcanizing apparatus.
" " No. 508,000, to JOHN C. DAVIDSON. Electric motor apparatus.
" " No. 508,050, to CHARLES H. RICHARDSON. Circuit-breaking device for reciprocating electric machines.
November 14.—No. 508,564, to THEODORE N. CLARK. Dental chair.
" " No. 508,677, to HENRY A. BURLINGAME. Dental impression-tray.
" " No. 508,692, to JONATHAN P. B. FISKE. Rheostat for controlling electrically operated dental apparatus.
November 21.—No. 509,176, to THEODORE G. LEWIS. Dental heater.

THE

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ORIGINAL COMMUNICATIONS.

SUGGESTION IN THERAPEUTICS.

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NOT the least interesting phase of the movement which has brought the phenomena of suggestion to the attention of the scientific world within the last twenty years is that which deals with the therapeutic aspect of those phenomena. That suggestion has a therapeutic value no experienced physician will question. The confidence which the manner and bearing of the man and the fame of his past achievements inspires is a factor whose importance in some cases all recognize. One often hears the physician say that every added year of experience adds assurance to his conviction that one can count little—with a few notable exceptions—upon the specific effect of the drugs administered, and that the success of the medical man depends largely upon his ability to keep the patient confident of recovery while "nature does the work for us." The researches of Bernheim and his colleagues at Nancy, and of many others, have brought to light a mass of facts which have not only revolutionized our theories as to the nature of the hypnotic state, but have prepared the way for an exact determination of the relation existing between hypnosis on the one hand and the many forms of suggestion seen in daily life on the other.

Thus, quite apart from the great significance of these researches to psychology and cerebral physiology, they have resulted in supplying a plausible scientific explanation for the so-called "cures of imagination" and "influence of the mind upon the body," "modern miracles," and so on. They also suggest many ways in which we may determine the conditions under which we may expect such results, and the methods by which we may attain them. It would be going too far to say that we can at present determine those conditions or prescribe the means. Yet we have gained some insight into the nature of the agencies thus set in operation. There is good reason for believing that in future the physician will not be compelled to rely upon his nice sense of just what to say and do in this case or that, but will be aided by a more accurate knowledge of the effect which his words and deeds may be expected to produce.

This will become more evident if we take a glance at the nature of that exceedingly complex phenomenon which we call language. From the point of view of the psychologist, and this is also that of the average man, the word is a complex of sensations, of definite quality and varying intensity, taken in a fixed sequence. When we hear the word spoken, these sensations are of the auditory order; when we see it written, they are of the visual order; when one writes or speaks it himself, they are of the motor order. Of these, the auditory complex is the most important to my present purpose. To the psychologist this sensory complex has a significance that is possessed by no other, except those sensations of color which are the foundation of vision. For the auditory complex, which forms part of any recognized language, plays in the mental life of those that speak the language a part that is played by no other. We can rarely introduce such a complex into a man's mind and hold it there quite alone. It instantly awakens a cloud of ideas of all qualities and complexities. Consider what a heterogeneous mass of visual, auditory, motor, olfactory, and gustatory ideas the word "dinner" awakens, and yet it is but one word. The sentence is only a larger word. True, its several parts bear more fixed relations to the several parts of the series of ideas which it awakens than do the individual sounds and syllables of the word to its corresponding group of ideas. This is, however, only an accidental relation, and cannot be carried out in detail. We know what "rose" means, and we know what "color" means; we know also what "color of the rose" means; but who can distinguish in the latter complex just those elements that are added by the words "of the"? This fact is recognized in some languages. In Sanskrit, for example, words coalesce with one another, are written together, and form larger wholes, reminding one somewhat of the compound words of German. The same is true of spoken English. Only in writing does the sentence consist of apparently independent parts. As spoken it must be regarded as an integral sensory whole, and, as it enters the consciousness of the hearer, it molds his thought into the image of the speaker's thought.

This is the view which the psychologist would take of language, and it does not essentially differ from that which we find prevalent among thinking people who have no especial interest in psychology. But the physicist and physiologist may look upon it from a quite different point of view. To him the spoken word is a physical thing. Before it reaches the tympanum it exists in the air as a moving molecular disturbance. When it strikes the tympanum it is transformed into molar motion of the tympanum and ear-bones. It then suffers a second transformation, and becomes a wave of molecular disturbance in the lymph of the inner ear, and this is again changed into a nervous process or current which traverses the auditory nerve to the center in the left temporal lobe, where it gives rise to a process in the cells of the cortex. At this point it is customary for the physicist and physiologist to step over to the position of the psychologist. He tacitly assumes that the physical thing has now disappeared and become a mental thing, a sensation, which no longer belongs to the physical world. This we no longer do. When the stimulus reaches the temporal lobe the sensation emerges in consciousness, but the stimulus does not then cease to be a physical thing, working out physical effects. We are indeed no longer able to directly observe those effects. They exist in the form of cortical disturbances whose exact character we do not know. But we are able, by means of the mental changes which those disturbances induce, to trace in some measure their progress. If, for example, the word suggests some visual object, we may infer that the disturbance in the temporal lobe has produced one in the occipital, since we know that the functioning of this lobe accompanies the appearance of visual sensations and ideas. This is an inference supported by many clinical facts. By a similar line of reasoning we can show that the seeing and thinking of normal life is accompanied by an inconceivably complex activity of the whole cortex. Indeed, each of our notions of persons, places, and things represents an organized and co-ordinated system of processes involving to some degree almost every part of the cortex, and as these ideas are tolerably constant, we must suppose, incredible as it may seem, that such a system of processes, once constituted, may retain its organic individuality for a considerable time.

Furthermore, since these cortical processes are physical things, they must have their definite causes and effects; and if every mental state represents to us such a process, it, too, must be treated as a dynamic thing, having its proper causes and effects. I do not wish to be understood as denying the conception of consciousness as an "epiphenomenon." Such questions of metaphysics the psychologist may, for the present, safely ignore. If our fundamental postulate be granted, that every mental state represents to us a cortical process of whose precise nature as such we know nothing, we are entirely justified for the time being in ascribing to its mental representative all that we would ascribe to the physical thing, had we independent knowledge of its character.

Let me analyze in detail the operation of one type of suggested idea, which is perhaps better understood than any other. Physiologists have proved that the so-called "Rolandic" region of the cortex is chiefly concerned in the contraction of voluntary muscles. Psychologists have made it highly probable that the last attainable conscious antecedent of such a movement is the idea of the movement, and this idea of the movement is simply a weakened revival of the muscular, articular, and dermal sensations attendant upon that movement. It is, then, also probable that the production of motor sensations and ideas is at least one of the functions of the Rolandic region. We will suppose that *a b c* represents the system of processes in the Rolandic region which corresponds to the straightening of the right forefinger. Now, if I awaken that process, or if it be awakened in any way, the idea will arise of the stiffening of the forefinger. Once aroused, the process must discharge in some direction. Usually it will occasion other processes attended by other ideas, and will itself fade out. But if this be prevented, and the process *a b c* remain, it will show a tendency to discharge downward, and actually produce the muscular contractions which it represents. As soon as the attendant sensations appear in consciousness, the cortical equilibrium appears to be re-established. This ability of the motor idea to produce a movement is now universally recognized by psychologists, and can be readily observed by any one. Hence, whenever I suggest to a man the idea of a given movement, I am setting agencies in operation among whose possible effects is the very movement in question. In the normal state there is very little probability that it will actually result from the suggestion. The agencies set in operation by it are few among many, and they may be overcome by others, or may exhaust themselves without producing the movement. But in hypnosis we find that the motor suggestion nearly always works out its specifically motor results. It matters little how the process *a b c* be started. I may say, "Your forefinger is stiffening"; "Think how it would feel if your forefinger were to stiffen"; "Stiffen your forefinger"; I may say nothing directly to the patient, but discuss with the bystanders the stiffening of his forefinger, or I may bend it out straight myself. The result will be the same,—the forefinger stiffens. One of my patients tells me that under such circumstances it seems to him as if his muscles were moved directly by my word without his own intervention in any way, except when told to think how it would feel to do so and so. Then he feels a constantly increasing desire to do it, which finally becomes irresistible. In such conditions we must suppose that the connection between the motor region and the balance of the cortex is seriously impaired; the motor idea, once awakened, is no longer exposed to the inhibition of other ideas, nor can it expend itself in the production of other ideas, but works like yeast in dough until it exhausts itself in producing a muscular contraction.

That the Rolandic region holds the hegemony, so to speak, over the movements of the voluntary muscles, is a known fact. Movements may take place without its co-operation, but in most cases it is directly concerned in the performance of the movement, and the great majority of movements are subject to its intervention. But when we turn from movement to other bodily processes, such as those connected with secretion and nutrition, we do not find that the evidence for cortical control is recognized as conclusive. These are dependent upon sundry nervous centers within and without the cranium, but that they can be affected by cortical processes, except in a few specified cases, is not usually admitted. I do not believe that the current view is tenable. Within the past few years popular attention has been strongly directed to numbers of astonishing cures, in which functional disorders of every kind, and even organic lesions, are said to have disappeared in consequence upon a strong conviction on the part of the patient that they were to disappear. As no causal connection is apparent between the cure and its proximate antecedent, sundry theories have been proposed to supply the missing link. Religious persons usually ascribe such cures to the supernatural intervention of God, or Christ, or the Virgin Mary, or some saint. Some think them wrought by disembodied spirits; others, as the "Christian Scientists" and "Metaphysical Healers," have devised semi-metaphysical theories by which to account for them. Finally, largely through the efforts of Dr. Daniel Hack Tuke and Dr. Carpenter, these phenomena have been forced upon the attention of that court to whose jurisdiction only they properly belong, the great body of physiologists and psychologists throughout the world.

The decision has not yet been rendered, and is not likely soon to be. Yet I for one am inclined to believe that as the outcome of this inquiry we shall see a profound modification of current psycho-physiological conceptions. We shall find that the control exerted by the highest nervous centers over all bodily processes is far more uniform and extensive than we now suppose, and we may discover the means of utilizing it with certainty for therapeutic ends.

From the theoretical point of view, then, the doctrine which we have been considering suggests some interesting possibilities. Language, it teaches, is an impalpable instrument by which, of all the infinitely numerous modifications of which the cortex is capable, certain definite ones may be evolved at will, and the others in large measure controlled. In brief, language is an instrument capable of controlling, to some degree, the functioning of the cortex. Now, of all disorders with which the physician contends, none are more refractory than those of the cortex. Only a few can be reached by surgery, and a few more by drugs. Most cannot be treated by any of our present means. May we not discover for language a line of usefulness in this direction which we do not at present suspect? And if the control of cortical processes over other bodily functions is really very extensive, may we not, by setting in operation or stimulating the very agencies by which nature herself keeps this bodily mechanism in running order, produce effects upon its general health of whose possibility we do not at present dream?

This will seem to many mere speculation,—theories, of some interest, perhaps, to him who spins them, as the spider his web, "out of his own inside," but possessed of no practical bearing. Yet the speculations which I have advanced have not been constructed deductively upon the theoretical principles laid down ; rather have those theoretical principles been framed to account for the rich mass of facts gathered for the most part by physicians in their studies of the effects of language, administered usually in the hypnotic state, upon the mental and bodily health of the patient.

As we all know, suggestions administered in the waking state usually produce no visible effect. The cortex is at all times a very hotbed of nervous activity, and the suggestion is but one of many competing forces. The action and reaction of one cell group upon another, of one system of such groups upon other systems, of one combination of such systems upon other combinations, must be at every moment more complex than we can possibly imagine. The subsequent condition of the patient is the resultant of all these forces, and it may well be that we fail to detect the effect of the suggestion. In the hypnotic state some unexplained change takes place in the cortex, greatly increasing susceptibility to suggestion, and suggestion in the hypnotic state has been found a therapeutic agent of no small value.

As one would expect, it has been found most useful in treating functional disorders of the higher nervous centers. Wetterstrand says he has found it more effective in such cases than all other agencies put together. Krafft-Ebbing, von Schrenck Notzing, and others have used it with marked success in treating acquired sexual perversions of all kinds. For these most loathsome forms of mental disease there has been hitherto no remedy. If the work of these pioneers proves permanent and is confirmed, we may believe that the remedy has been found. In future, instead of lynching the pervert on the spot or sentencing him to a long term in the penitentiary, we will send him to an asylum for treatment, and restore him to society in his right mind. The evil habits so frequently acquired in childhood and youth usually can be overcome by similar treatment. Suggestion has been successfully used in cases of dipsomania, and I think it more than probable that the results of the so-called "chloride-of-gold cure" depend upon the same principles. The use of suggestion in functional disturbances other than nervous has been attempted by many, with varying degrees of success. I have not the time here to enter into this question in detail; those who wish to study the evidence can find it in the works of Liébeault, Bernheim, Forel, Wetterstrand, and others. But it seems worth noting that even in cases where cure is impossible, suggestion may afford great relief. Wetterstrand relates a touching tale of a Swedish maidservant who died of phthisis under his care at the age of twenty-four. He found her suffering greatly in mind and body. By suggestion he calmed her fears, destroyed her pains, gave her eleven hours' unbroken sleep every night until her death, and enabled her to meet death with peace and resignation.

It is a curious fact, and one which we cannot at present explain, that of all forms of sensibility none yield so readily to suggestion as sensitiveness to pain. Spontaneous analgesia is an exceedingly common phenomenon of hypnosis, and even when it does not occur spontaneously it can be produced by suggestion when no effect can be made upon touch, sight, hearing, smell, or taste. This was early observed, and was turned to practical account before the middle of this century by Esdaile in Calcutta, Braid in England, and others, who performed surgical operations of the most serious character in suggested analgesia. The discovery of the anesthetic properties of chloroform and ether has prevented suggestion from taking any important place among our obtundents, but indications are not wanting that use will still be found for it. Many headaches and pains of hysterical or other ill-defined origin can be entirely removed by it where no one of our recognized anesthetics could be properly administered. Wetterstrand constantly uses it for trifling operations involving considerable pain, and in more serious cases hypnotizes before administering chloroform or ether. He finds that in this way he can produce profound anesthesia with a very small amount of the drug, and obviate most of the unpleasant after-effects.

The movement which has apparently been initiated in this country by Dr. Thomas Fillebrown, of Boston, to introduce suggestion into dental practice, is therefore in line with these similar movements in other branches of medicine. From the nature of the case, the dentist will not ask of suggestion as much as the physician would. The disorders with which the former has to deal are chiefly organic, and not even the most enthusiastic advocate of suggestive therapeutics will claim that one can fill a cavity or remove a tooth by suggestion without the aid of some more palpable instruments.

The dentist's interest in the matter is chiefly in its possible use as an obtundent, and he wishes to know of it, first, Can it be used as an obtundent? second, How can it be so used? third, In how many and what cases is it likely to prove useful? fourth, What possible collateral evils may result from its use?

I have already pointed out that suggestions may be administered either in the waking state or in hypnosis. No sharp line of demarcation can be drawn between the two. We find transition states through which the patient passes while going into typical hypnosis or lethargy, and we also find intermediate states presenting an almost infinite variety of phenomena, which, although relatively permanent, are scarcely to be termed strictly hypnotic, and yet are certainly not normal. For practical purposes I shall treat all those states in which the patient loses consciousness and memory as "hypnotic," and those in which he retains consciousness and clear memory of all that is done to him as "normal."

1. In hypnotic states, then, analgesia can almost always be produced, and total anesthesia not infrequently.

2. The methods of producing such states cannot be detailed here. Those who desire more exact information can find it in the many works on the subject, of which I may mention Moll's "Hypnotism" and Bernheim's "Suggestive Therapeutics" (tr. C. A. Herter) as the best in English.

3. No reliable material exists upon which to base an estimate as to the number of persons per cent. of our own race that are susceptible to hypnosis. Moll, from a consideration of French and German statistics, puts the proportion among those races at about twenty per cent. But in any case so much appears to depend upon the skill of the operator that figures based upon the results of one would not go far toward telling another what he might expect to accomplish. Further information on these points is much needed, and it is to be hoped that all who make any extended study of hypnosis will keep record of all unsuccessful as well as of all successful attempts.

4. The collateral dangers that may result from the use of hypnosis are not easily estimated. It is probable that the physical evils sometimes resulting from it can all be obviated by suggestion. Wetterstrand, after producing the hypnotic state upwards of sixty thousand times in upwards of three thousand individuals, has never observed any ill effects that he could not at once remove.

This is the experience of all, so far as I am aware. Serious dangers may, however, spring from the administration of alarming or dangerous suggestions, or from the operator's forgetting to remove a suggestion once given. For such difficulties he has himself to blame. There is no doubt whatever in my mind that serious mischief may result from the practice of hypnotism by ill-informed persons, and I would not advise any one to attempt it without first acquainting himself thoroughly with the standard works on the subject.

The moral dangers attending the use of hypnosis are far greater than the physical, and are greater than those attending the use of any other obtundent. Not only is it possible for the operator to take advantage of the temporarily helpless condition of the patient, as in other cases, but it is also possible for him to give suggestions which will affect the subsequent conduct of the patient. This constitutes, in my opinion, the chief reason why the practice of hypnotism for any other than certain specified and approved ends should be discountenanced by public sentiment, and possibly forbidden by law.

For these reasons it does not seem to me that the use of hypnosis as an obtundent should be recommended to the dental profession as yet. That it would be found useful in many cases I have no doubt; and if every dentist could be trained in the art outside his profession, it might be desirable for him to use it within it. But it is quite another matter to advise him to experiment upon his patients by way of learning how to hypnotize. When the theory and practice of hypnotism is included in our medical curriculum, as it undoubtedly will be at no very distant day, it will be time enough for it to be put into general use. Until that time the dental profession can well afford to dispense with it.

If, however, we turn to the use of suggestion in the waking state, or in a state not far removed from the waking state, such as can be produced in most persons by closing the eyes, gently stroking the brow, and uttering a few authoritative words of comfort and reassurance, we will find that none of the above objections apply. I know of no dangers that can ensue from suggestions thus administered, and have no doubt that good may be so accomplished. It is certainly possible to produce partial or total analgesia in this way; and even when that cannot be done, the emotional disturbance and fear, which is worse than the actual pain, can be entirely calmed. We are not yet in position to prescribe the means of making suggestions in the waking state most effective. In general we may say that the operator should first acquaint himself with the temperament and opinions of the patient. If the suggestion presents itself to the patient as a logical outcome of his system of thinking, its efficiency will usually be increased. Upon this depends the efficacy of charms, amulets, most patent medicines, "rheumatism rings," "electric belts," *et id genus omne*. I am inclined to believe that the "high potentiation" of the homœopath owes no small part of its virtue to similar principles. We always find that self-reliance on the part of the operator adds weight to the suggestion, and often a determined manner, fixed gaze, and commanding tone will seem to force it upon the patient. In other cases the tone of command will instantly arouse the patient's resistance, and the suggestion fails. Suggestions conveyed in print appear to possess a peculiar persuasiveness to many minds, and it is likely that the immense success of modern advertising is partly dependent upon this fact.

These are the methods advocated by Dr. Fillebrown, and the discussion that followed the reading of his paper at the World's Columbian Dental Congress last August (see DENTAL COSMOS, September, 1893, pp. 985–1007) showed that many of the gentlemen present had long used methods closely similar to his, although few were acquainted with the theory of suggestion or its psycho-physiological basis. They had used suggestion in other words more or less unreflectively as an art, as does every experienced physician and dentist, but that it could be put upon a scientific basis and made a recognized therapeutic organon had occurred to few. This, I believe, will ultimately be done. We shall learn how to estimate more exactly the suggestibility of every individual; we shall learn how to increase it, and be able to judge of the risks of so increasing it; and we shall be in position to determine what results we can produce. Then, we may hope, the dentist, like his medical brother, will be able to use suggestion, not empirically as he now does, but with a clear knowledge of the end he wishes to attain, of the means by which he is to attain it, and of the psychical and physical agencies which he is setting in operation.

PRINCIPLES VERSUS EMPIRICISM.

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It is common to find both of these terms applied in too narrow and vague a sense. We are prone to overrating the importance of our collections of facts, and invest them with more dignity than is their true portion. It would seem a principle is regarded by many as a species of cause and effect, affecting one or two cases under consideration, this being not infrequently deemed sufficient to justify the application to them of the generic term. As a matter of fact, such reading is but little removed from the proper conception of empiricism. Much that is called empiricism is, on the other hand, nothing more than the crudest form of guesswork.

This applies in a marked degree to what we term principles of certain arts, these, in truth, being but a disguised empiricism. The complexity, accuracy, and exact adaptation of these, however, may or does constitute a fine art; this in contradistinction to the two-and-two-make-four species of application which go to make a mechanical art.

As an example of this, the definition between a painter as a mechanic and as an artist. Both combine and apply colors, but one recognizes merely that certain combinations of pigments in the nature of a mixture will give a definite color. With the production of this and the making of a surface from it, the artisan is content; more than this does not, as he sees it, directly concern him. To the artist, many—very many—such facts are merely the alphabet. To the crude knowledge, observations of the artisan in this particular, place in contrast the craft of the painter. He recognizes not only the primitive empiricism of the mechanic, but in addition the mutual reactions which give effect when colors are placed in juxtaposition, and has the skill to apply them in the interpretation of ideas, or in exact imitation of what is seen or what should be seen.

Granting this, it is but empiricism of a refined type. The elements of why and therefore are needed to make a principle of such knowledge. This detracts nothing from the dignity of such following, for we must acknowledge that the accumulation and application of this form of information arises from psychologic process of as accurate a nature as though it were a scientific procedure. Although the involved empiricism is not exactly substitutive for a principle, it is usually a step in the transition from empiricism to principle.

Recognition of such distinctions will make clear what are distinguished as professions, what as fine arts, and what as mechanical arts. The first have foundation in science; the second, in tradition and in exact and applied observation; the third, in observations of a more restricted type and field than the others.

The science a something in which the highest mental faculties are most involved. In some cases, cerebration is the sole cause of results. We need but allude to Newton and Beethoven as examples.

The second, the fine art, while it demands the co-ordination of thought we know as reason, there is in addition the necessity for the application of the emotional reactions; this with an education of the motive apparatus of the utmost refinement.

In the third, the mechanical arts, the exercise of the highest cerebral functions forms the less part, the motive apparatus being trained to a more or less rhythmic action.

The first is an education which may be applied abstractly; the second, less so; the third, scarcely at all. It is science, the parts of which are composed of principles. When we apply the term to either of the others, we admit the element of question as to fitness.

For instance, a scientist determines abstractly that definite combinations of which he has exact knowledge will have a result which he has foretold. This is demonstrated, and to it are added many such facts, all of which are finally generalized and the generalization verified. This is founding a principle. It by no means follows that all who make use of his labors are scientists. Those who avail themselves of individual elements of his work may, in fact, be but mechanics.

A case in dentistry here. For many years agents yielding chlorin in gaseous forms were in use for bleaching teeth. A chemist of the profession, reasoning that sulfurous acid fumes are a bleaching agent, determines abstractly that such a product will be formed by a definite combination of bodies of which he has exact knowledge; that it will be of such nature as to produce a predetermined result. Experiment verifies this, and we call this a purely scientific procedure. It does not follow that all who avail themselves of such a method in the attainment of what we call practical results are scientists.

Again, the scientific pharmacologist premises that a change in the atomic or molecular arrangement of one of the carbon compounds will affect its therapeutic properties. By experiment he verifies this assumption. The physiologist observes the specific effect of quinin upon the blood and blood-vessels, and recognizes this as being antagonistic to the inflammatory process. This is one-half scientific: the observation being primary, the why is still a doubtful quality. It does not follow that any one who uses the results of the pharmacologist's labors or administers quinin to abort an inflammation is a scientist.

This is, in fact, as near an exact science as the medical practitioner ever attains, save in rare instances. That is, medical science as we know it to-day is one-half empiricism. Biology itself has not quite reached the point of being a true science. In proportion as this latter, and its dependent, medicine, attain exactitude, in that rate will the practices be affected for the better; in that degree will their usefulness be enhanced. Medicine as a science will have as its mission the causing of such tissue-metamorphosis as will overcome disease-process, or will remedy any variation from normality. Until the means to accomplish such end be determined through abstract reasoning, medicine has not lost its element of empiricism.

There are certain formulations, narrow it is true, which we call principles, and apply them to dental practice. Of the number which might exist we can say nothing. Of these which do, but little in defence of their claim to the title of principle. Miller's work approaches the scientific more nearly than any, but the results of his investigations form but part a principle. Through his labors a generalization is growing, but there are still vital elements wanting.

In what are called the principles of crown- and bridge-work in the restoration of lost parts of teeth, mechanical laws are ignored daily, as are those of hygiene. All the work—at least ninety-nine per cent. of it—done with conservation of the dental pulp as its object, has been gross empiricism. Even the filling of root-canals, for which a principle should be had, is more than one half empiricism. Common sense, to say nothing of scientific reasoning, is being constantly violated.

Just a glance at the question of phagedenic pericementitis, and the cup is full.

Much of such a state of affairs arises from the craze for the practical, as many are pleased to term it; apparently not recognizing that a body has more than a surface, and that the scientific, properly viewed, is the practical. This craze has resulted in a ragged building, erected brick by brick; most of those who add one of these units viewing it with too much complacency to permit his making a general survey of this nondescript edifice, now not at its first story. Even though a survey be taken, perspectives and projections are ignored. A one-sided view is too often deemed sufficient.

Worse than this, for every one adding a brick there are twenty onlookers counting them one by one and crying aloud in great elation the results of the enumeration. Below these, there are those who do not even count. A stray brick is picked up and a lifetime is spent in thumbing it. And this is what is called being practical. The most superficial observation will demonstrate what an indifferent degree of education of the higher faculties this represents. It recognizes merely the existence of an impression upon a substance, and stopping there; no interaction between these effects being necessary in such cerebration as this.

Truly such knowledge is mechanical, the very raw material of even empiricism. The co-ordination of impressions made upon cells of the cerebral cortex results probably in thought. The co-ordination of these thoughts is reason, and it is from this there comes the faculty of abstract mentality. It is this which always has, does, and must give rise to the formulation of principles. It can be derivative from no other source alone.

While there is probably no one who would have the temerity to deny to dentistry the possession of great stores of information, any searching examination of this will demonstrate a paucity of principles. Neither can it be denied that any verified observation has its value; but how much is this value enhanced if it is placed in relation with all kindred facts, and a generalization, perhaps a principle, made of them. A fact is a thing by itself; a principle may embrace a thousand of these elements, and knowing this, one has a comprehension of that thousand. It would be a gloomy outlook for any man young in a profession were these generalizations not made; he must need be of equal age in practice in order to cope with others. Principles, in fact, prolong the lives of professional men. Very fortunate is the one who can reduce his life to as few as possible. While it is necessary that sciences have links, it is of more importance to have these formed into a circular chain; for, given only the links, a chain may never be made, but, given a chain, the links are self-evident.

Society reports are full of abstracts from papers which would seem to indicate that Miller, Andrews, Black, Kirk, and others of our investigators possessing originality have labored in vain, as far as the writers of those papers are concerned. Through laborious research gentlemen of this type have given to dentistry good, sound generalizations, fit for application to daily practice. Miller, through a discovery of cause, makes rational means of prevention a logical sequence; gives us the key to the mechanical and chemical means of overcoming effectually the ravages of dental caries, and points out hygienic means of preventing its recurrence. Using his observations as a groundwork, much of the discussion, much of the practice we see, becomes irrational; and yet the way to correct practice is so clear an inference as to be self-evident. Observations of the same investigator give us *principles* for the treatment of teeth containing infective matter. His experiments upon the comparative value of antiseptics should go far to solve the question of root-filling; for certainly he has furnished us with a principle (although not formulated) for the treatment of such conditions.

Were the application of his teachings more general, more reasons and fewer nostrums would be the order of the day. Prof. G. V. Black, in the "American System of Dentistry," furnishes an exceedingly valuable set of observations in dental pathology. While in many particulars he leaves us in doubt, there is sufficient material to be of inestimable use. Despite this, it is not unusual to find members of the dental body writing in such strain as would indicate a practice diametrically opposed to his *demonstrated* teachings.

Meaning by all this, that the way out of many of our dilemmas lies in recognition and application of scientific labors, too often regarded as so thoroughly theoretical as to have no practical application. It is questionable whether this be true even of certain questions in dental embryology. Most certainly all the work done thus far in *scientific* pathology, histology, and chemistry is, properly viewed, of the utmost practical value. We but waste time in labors which have not purely scientific basis, for take what road we will, it must, to be stable, come to the path pointed out by science.

The difference between a practice based upon empiric method and that from principles is essentially one of a difference of the education of the nervous faculties. From the general sensitivity of an amœba to the mental process of a Helmholtz, and we have all grades between. The higher the man, the more is the periphery servant to the center. The greater the force, the more is it concentrated in its citadels, the truly central nervous system. This is the engineer's office where works are planned, methods devised, which a properly trained motive apparatus as workmen, execute as thoroughly responsive subordinates. If there be a proper adjustment between them, the periphery obeys to the last detail every command of the center. A definite result desired, and the mechanical execution of it is a smooth procedure. In perfection of the adjustment between ruler and servant, ideals are easy of accomplishment. The beautiful results of this form of training may be seen in the work of some few expert dental operators. How far this nicety of manipulative detail is carried is seen in a work of Dr. R. Ottolengui, on "Methods of Filling Teeth."

IDEAL BRIDGE-WORK.

BY M. L. RHEIN, M.D., D.D.S., NEW YORK, N. Y.

(Read before the First District Dental Society of the State of New York, December 12, 1893.)

ARCHEOLOGICAL researches have unearthed various types of ancient artificial dentures, ranging from the specimens of Etruscan gold work to the stringing together of the teeth of animals attached by ligatures to the remaining natural teeth. In all these specimens of primitive dental work we can detect no attempt made to have the fixture impinge in any way on the soft tissues ; on the contrary, every effort seems to have been concentrated to confine the artificial substitutes to the spaces in the arch caused by the loss of the natural teeth.

There is much food for reflection in the fact that at the close of this nineteenth century of progress, and especially of advancement in mechanical technique, the brightest and ablest workers in the field of prosthetic dentistry are bending all their energies to solving this problem : How to discard the use of plates.

For years dentists have been inventing appliances and materials that, by grasping hold of some other portion of the oral anatomy, would retain the artificial teeth attached to them in the dental arch. The strange spectacle presents itself to our view that to-day, at least in the United States, the vast majority of the profession have departed from the instructions of their teachers and are worshiping at the altars of the Etruscans, those wonderful fashioners of gold who lived many centuries before Christ. They have grasped the idea of the ancients that the insertion of artificial teeth in the human mouth should not necessitate the impinging on tissues adjacent to the dental arch, and as a result we have the present deluge of bridge-work, which is spread broadcast over our country, and is now also permeating foreign lands.

Let us stop and consider what effect this craze for bridge-work has had upon the profession. Has it been a blessing or a bane? There is quite a respectable number of conservative practitioners, men of sterling qualities and of the highest qualifications as to ability, who have never ceased to decry and condemn the evil effects of what bridge-work they have seen.

After a careful consideration of the subject, you will perhaps agree with me that, like almost every other human effort, the effect of bridge-work on the profession has been a mixture of good and evil.

Let us first consider how we have been benefited by this return to primitive dentistry. Every student of dental history recognizes the detriment that was wrought to the mechanical skill of the profession by the introduction of vulcanite. In an incredibly short time the number of gold-plate workers had become so few that they were easily counted. The prosthetic specialty of our calling had become so degraded that most of our best men intrusted this work to ordinary laboratory mechanics, whose compensation was on a par with the quality of their work.

At the time when mechanical skill in our laboratories was at its lowest ebb, one of the greatest operative dentists that has ever lived, Marshall H. Webb, felt the demand for something in the prosthetic line that would somewhat approach the ideal of excellence which he invariably attained in his operative work. He took his cue from the work performed by Dr. B. J. Bing, of Paris, and first described in the Dental Cosmos of October, 1869, by Dr. H. D. Bennett, of Paris.* Dr. Bennett's paper received little attention in this country until 1873, when Dr. Webb commenced the practice of inserting single artificial teeth into cavities in the approximal surfaces of the adjoining teeth.† His method of work, as is well known, was a vast improvement on the style of that done in Paris.

Reports of isolated specimens of bridge-work are published as early as 1805 by J. B. Gariot, and in 1820 by C. I. Delabarre, and by Dr. S. S. Fitch, in New York, in 1829, and by our own member, Dr. W. H. Dwinelle, in 1856.‡ To Dr. B. J. Bing, however, is due all the credit of reviving this antique method of inserting artificial teeth.

A paper read by Dr. H. C. Register, entitled "Grafting Artificial Crowns in Lieu of Plates," before the Odontological Society of Pennsylvania, on January 8, 1881,|| shows that he had for some time been following Webb in this style of work. From this time the growth of bridge-work through the ranks of the profession can be likened to a vast prairie conflagration, slow at the start, gaining in force as it proceeded, and terminating by the downfall of everything in its path of progress rather than of destruction.

This influx of new methods of inserting artificial teeth brought back to our dental laboratories the gold-workers, and private courses for mechanical dentists in plate-, bridge-, and crown-work were a source of considerable revenue at one time to a certain class of dentists.

In this manner no one dares to contradict the fact that bridge-work has been a great blessing to the profession. It has been the means of educating the men engaged in the mechanical construction of these devices to a point nearer to perfection in mechanical technique than has ever before existed in the profession. It has also served as a stimulus to the inventive capacity of dentists, as is easily demonstrated by the vast number of methods of inserting artificial teeth without plates which are now practiced.

Let us now look at the other side of the picture. What have been the bad effects of this craze for indiscriminate bridge-work? Well do I remember a visit paid to me by a detective of a celebrated bridge-work concern, who was seeking to levy blackmail by threatening an injunction unless royalty were paid. This man came to me in the guise of a patient, and as I entered the waiting-room I could smell bridge-work from the entrance. Who that has come near to the foul-smelling mouths created by such work dares for an instant to deny that while the work has been productive of much good, it has produced a corresponding amount of evil? Many able men in the profession have told me that the visits of people with mouths in such a condition have caused them to irrevocably condemn the work.

Like every innovation of a startling nature, the quacks and charlatans were in the front ranks of those who vaunted this new panacea for human suffering.

This class of harpies were in it for nothing but the dollars they might squeeze from the pockets of the innocent fools who, in answer

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* Dental Cosmos, vol. ix, No. 10, page 509.

† Webb on Operative Dentistry, page 135.

‡ Evans on Artificial Crown- and Bridge-Work, page 134.

|| Dental Cosmos, vol. xxiii, No. 5, page 257.

to their pictorial advertisements, would flock to their offices. As their alluring bait soon crowded their nets with golden fish, they subdivided their apartments into "parlors" for the rich and humbler offices for the poorer classes. They supplied high-priced operators, medium-priced bridge-workers, and low-priced dentists for the poor,—"so that no one need go without the priceless blessing."

There was never an iota of genuine professional feeling in these establishments; they were conducted solely as a business enterprise. The earning capacity of their employes was the guide as to fitness and competency. Admitting that some of the men employed in these places were skillful, and *sometimes* did good work, what can be said of the majority of the work which has come to us, reeking with pus and foul with the odors of necrotic bone? Even the best men whom they employed were soon taught to suppress any conscientious scruples which they might have possessed at their entrance to this "Inferno," and soon learned that "quantity" of bridges was wanted, not "quality." A large number of our practitioners, seeing their patients lured into these places, instead of counteracting the evil by accomplishing better work, went as disciples to these dens of deception, and were taught their methods of bridge-work, and returned to their own offices to practice these iniquities, allowing their conscience to fall also into utter disuse.

Dr. Webb, in discussing the paper of Dr. Register before alluded to, said in speaking of bridge-work, "The whole operation would have to be well performed by a fine operator, or not performed at all."* This sums up in a nutshell the cause for the immense amount of evil that has been caused by the indiscriminate insertion of bridge-work. Fine operators do not grow on every bush, nor exist in every dental office. *The operation should never be performed unless by a fine operator, with his best energies devoted to the task.*

We might as well try to count the stars in the firmament, as to estimate the number of good teeth that have been ruined and lost in this country during the past ten years by the efforts of incompetent men (I am unwilling to elevate them to the distinction of calling them even poor "operators") in utilizing these teeth as supports for their bridges.

A large percentage of bridge-work has not only been a failure, but a positive source of injury to the general health of the patient, by the utter disregard paid by the mechanic to the necessary treatment of the portions of the mouth to be bridged, and more especially to the teeth to be used as abutments.

This is well illustrated by a case once exhibited before this society, where the operator was without doubt a skillful mechanic. With that reckless disregard for the health of a root used as an abutment, which only the densest ignorance would dare to assume, he stated that he "never bothered about sealing the ends of roots."

In this case, the patient upon whom he demonstrated his method of work was compelled to have the main tooth used as an abutment extracted. It was then noticed that this dental carpenter had pierced the side of the root with a post which he had firmly screwed about one-quarter of an inch into the maxilla,—a very firm anchorage, if the human economy would tolerate it. The flow of pus and disagreeable odor that started up within two weeks of the operation did not cease until not only the tooth was removed, but also a piece of necrosed bone about one inch long. This is an example of the greatest evil that has attended the introduction of bridge-work,—its insertion into the mouth without regard to the health of the patient, and by men lacking in the knowledge that would enable them to distinguish between health and disease.

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* DENTAL COSMOS, vol. xxiii, No. 5, page 262.

To sum up, the evil wrought by bridge-work is due to its being practiced so largely by men of three classes: First, those lacking in ability; second, the uneducated; third and worst class, those whose conscience has become so atrophied that a microscope would scarcely find it.

Admitting the abuse of this work, but recognizing the practical necessity for it in the increased comfort it so often gives to suffering mankind, let us leave the theoretical and consider the practical side of the question.

The method first advocated by Dr. Webb, of filling single teeth into approximal cavities in adjoining teeth, is to-day, with some slight modifications, an excellent way of replacing single anterior teeth; but when this is put into practice in the posterior portion of the mouth, or where more teeth are to be supplied, the strain from mastication is too great in the majority of cases. There are unquestionably numerous cases of large bridges held securely for years in this way. In fact, the writer can point to the porcelain bridge of eight teeth illustrated in Evans's book on "Crown- and Bridge-Work,"* and inserted in this manner, as being in good condition to-day, having been in use now five and one-half years. The amount of masticating force in the jaws of this patient is much below the average, and in other mouths, where the force is about the average, such pieces have been known to give way sooner or later, no matter of what material they were constructed. With our advanced skill, and considering how difficult it is to keep the parts under such extensive bridges absolutely clean, they must be discarded.

To-day, the vast majority of the profession, in speaking of bridge-work, refer to one solid piece of work which terminates at the ends in artificial crowns which are cemented over teeth or into roots which are to serve as the necessary abutments.

The objections to this class of bridge-work are as follows:

First. The rigidity of the bridge is abnormal. While the artificial substitutes should be immovable as far as any possibility of being thrown out of position is concerned, still, to relieve the abutments from undue pressure, it is necessary to get a delicate movement which will approximate the cushiony elasticity of the natural teeth in the alveoli.

Second. The so-called self-cleansing spaces are not only a receptacle for *débris*, but a source of constant annoyance to the tongue, and consequently often interfere with speech.

Third. When it becomes necessary to repair an immovable bridge, the result is a bungling and clumsy piece of work, as it must be done in the mouth. The removal of the piece generally entails the entire destruction of the crowns which go over the abutments.

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* Evans on Artificial Crown- and Bridge-Work, page 245.

Fourth. Where the abutments are teeth with living pulps, it necessitates either the removal of the pulp or of sufficient of the exterior of the tooth to enable a solid crown to be perfectly fitted to it. In overhanging teeth and those loosened by attacks of pyorrhea alveolaris, the removal of sufficient amount of tooth-structure generally invites subsequent troubles of a serious nature.

These are four objections of such vital importance that they should deter any conscientious man from inserting bridges in this manner, especially when so many better methods are available. Yet we repeat that most of the work is done in this way, and there are many now who understand nothing else by the term "bridge-work."

The large number of men who have evolved various methods of removable pieces indicates that numerous failures have been the necessities which have created so many inventions. For the various forms of these we are especially indebted to Parr, Starr, Winder, Evans, C. Richmond, Waters, Curtis, and many others.

In this connection, while not having the time to enter into the detail of description, it may not be inappropriate to praise the mode of inserting small partial dentures with clasps, and practically without plates, described by Dr. W. G. A. Bonwill.* By this method, while we have the advantage of not mutilating good teeth, the piece lacks the comfort of a more perfect form of bridge-work, and offers a much more attractive field for the bacteria of caries than they ought to have the good luck to find in removable bridge-work properly constructed.

In almost all the forms of removable bridge-work, objections Nos. 2 and 3 are overcome. No. 1 is overthrown in a few methods, but heretofore the fourth objection, viz, the mutilation of healthy teeth required as abutments, has not been met by any published method of work. To overcome this objection, Dr. C. L. Andrews and the writer have been assiduously working for the past ten years. To-night we present to you the results of our labors as a step nearer to the ideal in bridge-work; and we would say that it is not a brilliant and suddenly conceived invention of a day, but the conclusions arrived at after the repeated devising and discarding of many ideas and forms, including the methods of other men. In presenting this result of evolution in dental bridge-work, we do not say that it is the only method that ever should be used, for we prefer to teach the dogma of eclecticism in dental practice. "Judge each case by itself, and do what is best for that case."

Dr. Andrews and myself having arrived at the conclusion that we could only look for the best results in removable pieces, we kept constantly before us five objective points necessary to be attained:

First. The artificial substitutes should as nearly as possible restore the form of the lost tissues, whether gums, bone, or teeth; there should be neither exaggeration nor depreciation in the extent of the restoration.

Second. When in position, the bridge must be held in an immovable position, and yet there should be possible a certain delicate vertical motion, to imitate the cushiony elasticity of the natural teeth in their sockets.

Third. Easy removal and replacement of the fixture to comport with every means for keeping the parts as clean as the natural teeth can be kept.

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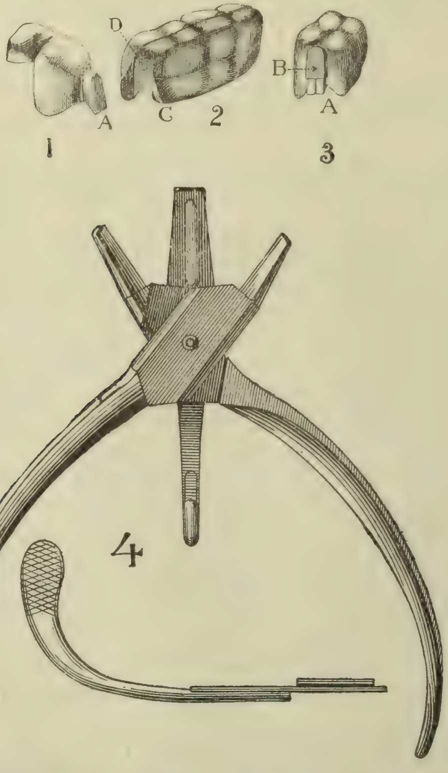
* *International Dental Journal*, vol. xiv, No. 2, page 86.

Fourth. To place all necessary coverings over teeth used for abutments in such a way as to thoroughly protect them from decay, or from irritation by any foreign material.

Fifth. To avoid in any manner mutilating a healthy tooth, except the trifling grinding that may be necessary to preserve the proper occlusion, and still cover this portion of the tooth.

In Fig. 1 we show you a bridge meeting all these requirements. Fig. 2 shows a cast of the inferior maxilla of a patient, Mr. A., aged fifty-nine years. On the left side of his inferior maxilla the bridge represented in Fig. 1 was placed in position.

Fig. 1.



Notice especially the overhang of the teeth. Taking this into account, together with the facts that the molars were loose, portions of the roots exposed, pyorrhea alveolaris present, and pulps alive, it will readily be seen that the advantages of not mutilating such teeth are many. Considering the very nervous condition of the patient, it is questionable whether in the loose condition of the molars he would have consented to any grinding of the enamel. All of the inferior teeth were worn down about one-sixteenth of an inch, and as the superior teeth had all been lost, the length of the inferior teeth was readily raised to their original plane.

In Fig. 1, 1 and 3 represent the gold crowns prepared to go over the abutments. The crowns have attached to their approximal sides gibs (A, A), somewhat cone-shaped and under-cut.

The bridge (Fig. 1, 2) has attached to it at either end thin shells of clasp metal (D), which form slots which fit accurately over the gibs (A). These slots are entirely covered by the contouring material of the bridge, except a small triangular portion on the lingual side (C). This is left exposed, and by being slightly bent inward forms a spring which locks the bridge in position. The patient can easily insert and remove the denture by sliding it over the gibs.

This idea of a gib playing in a slot has been very thoroughly expounded by Dr. F. T. Van Woert as a method of attaching porcelain faces to crowns without firing the porcelain, and also enabling broken porcelain faces to be readily replaced by new ones, without disturbing the pin in the root. The method was first designed and introduced to the profession by Dr. I. F. Wardwell for bridging a very narrow space by first building the ends of wires, unencumbered by the porcelain face, into fillings in adjoining approximal cavities, and then attaching the porcelain face to the slot in the backing.*

FIG. 2.

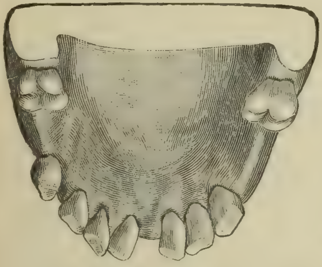
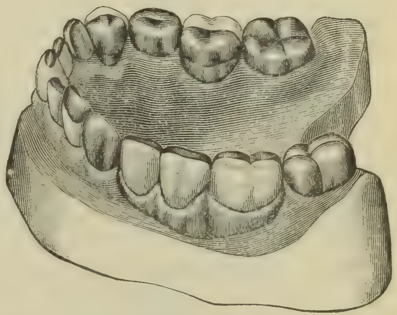


FIG. 3.



To Dr. Van Woert, however, is due the credit not only of making this method of dovetailing porcelain faces to metal backs better known, but also of improving it so that the safety of the porcelain is never endangered by contact with heat. He also made the system much more practical by inventing the pair of pliers shown in Fig. 1, 4, designed to make the metal backing fit accurately over the gib riveted to the tooth.† In using the dovetailed gib in bridge-work, the size of the gibs varies according to the width of the tooth, and for these cases the slots are made by other means which will be detailed later.

Where the swell of the tooth used as an abutment prevents the accurate adjustment of a closed crown without mutilating the tooth, the desired result is obtained by slitting the approximal side of the crown through the center of the gib. The crown can now be perfectly adjusted to a tooth having any amount of swell and overhang up to the extent that the sides of the crown will stand bending apart without fracturing the metal. The crown having been cemented on the tooth and the open ends of the gib quickly brought into position, they are securely held by the key being cemented over the gib (Fig. 1, B). Wherever a crown is split in this manner to go over a tooth with a swell to it, the slot in the bridge at that end is made to fit the key instead of the gib on the crown.

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* Webb on Operative Dentistry, page 140.

† DENTAL COSMOS, vol. xxxiv, No. 1, page 47.

Fig. 3 shows the cast of mouth represented in Fig. 2, with three separate bridges in position, inserted by this method. The one on the left side is the bridge represented in Fig. 1. In this denture, the anterior crown used as an abutment has attached to it a half crown to go over the upper half of the left inferior lateral, to provide additional strength for the anterior abutment (Fig. 1, 1), and at the same time to extend the occluding surface of this lateral to the same height to which the right lateral and central incisors have been lengthened by means of gold and platinum fillings impacted by the electro-magnetic mallet. The patient has no difficulty in readily removing and replacing all three pieces.

The last lower molars were very loose when the dentures were first placed in position, and while the bridges have not been in place as long a time as many others, there is already such a marked improvement in the firmness of the teeth that if hygienic care of the mouth is maintained, there is no doubt in our minds, judging from results in other cases, that these teeth will become perfectly firm. The case is illustrated and described exactly as managed in the routine of daily work, without any idea of bringing it especially before your notice.

The bridge itself can be constructed of gold, gold and platinum, all porcelain, rubber, platinum, aluminum,—in fact, in any manner that the operator desires,—and at the same time the restoration of the contour of the lost parts can be supplied up to any desired point.

Having attempted to explain to you the appearance and method of application of this form of bridge-work, we claim that it meets all five points which we especially desired to attain, and in which every other form of work is more or less defective.

First. The dentist having an absolute choice of any material of which he desires to construct his bridge, the question of contour and restoration of lost parts becomes merely a matter of judgment.

Second. The spring on the slot of the bridge, while it holds the fixture absolutely firm and secure, preventing any possible lateral movement of the teeth used for abutments, yet allows a delicate elastic motion of the bridge which not only closely imitates the movement of the natural teeth, but lessens that intense rigidity which is too much of a strain for the abutments.

Third. The easy removal and replacement of the fixture speaks for itself.

Fourth. All crowns that cover the teeth used for abutments are made to fit the parts under the gum as accurately as possible, and immediately after the cementing of the crown are burnished to a knife-blade edge. Where a root is used as an abutment, and a porcelain face attached to it, the pin runs through a cap which perfectly fits the end of the root and protects it from caries.

Fifth. The mutilation of teeth with living pulps is avoided by the use of crowns with one side split.

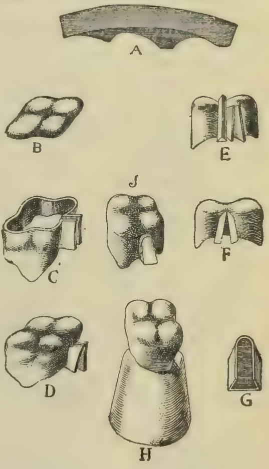
All the credit for the ingenuity displayed in mastering the mechanical technique necessary to accomplish the result portrayed, is due to Dr. C. L. Andrews.

I shall endeavor, as briefly as possible, to describe and illustrate in detail the manner of carrying the work to a conclusion.

The adjacent teeth should be freed from any vestiges of calcareous deposit, and thoroughly polished. If the tops of any of the teeth used as abutments need to be shortened to allow for proper occlusion, this should now be done, and if there is not sufficient room for gold, gauge 30, to pass between the teeth, this should be obtained by wedging, not by mutilation of the enamel. The teeth in position having been carefully wiped with olive oil, a plaster-of-Paris impression of the parts is taken. A cast having been made, the teeth that are to serve as abutments are trimmed on the model to the distance of one-thirty-second of an inch under the gum. The model is then stearinized, and in careful hands the entire fixture can frequently be made on the original cast. Where there is danger of marring the plaster, zinc dies of the teeth on which crowns are to be placed should be made.

To illustrate the detail of construction, turn to Fig. 4, H, representing a tooth over which a crown is to be made. It is an upper molar, free from decay, with a healthy pulp, but with the roots slightly exposed, as is so often found in these cases, whether from the ravages of pyorrhea alveolaris, or a tilting forward of the tooth, due to the loss of adjoining teeth and a faulty occlusion.

FIG 4.



Having selected a piece of gold (twenty carat and 29 gauge) it is struck up on the die to fit over the occluding surface of the tooth, and down the sides to a point where the swell of the tooth commences (Fig. 4, B). This distance varies, according to the size and shape of the tooth, from one-sixty-fourth to one-sixteenth of an inch.

The bridge, to be removable, can be no longer than the shortest distance between the two teeth that are to be used for abutments; consequently our next step is to determine the two points on top of the ridge between which there is the shortest distance. Having obtained this by means of compasses, it is marked on the edge of a piece of stiff cardboard, which is then squared so that both sides are parallel. The lower edge of the card is then cut to assume the exact profile of the top of the ridge at the point corresponding to the shortest distance between the teeth. Holding the cardboard as the bridge will move when completed (Fig. 5), with a sharp-pointed pencil mark the ridge alongside the edge of the card and the point of contact with the grinding-surface of the tooth. This will indicate the exact position which the gib will assume on the crown and on the ridge.

To obtain the pattern for the remaining portion of the crown, take a piece of heavy tin foil, similar to that used for covering the top of a champagne-bottle. With this fit the sides of the tooth perfectly, as far as carved on the model, allowing the ends to extend about three-sixteenths of an inch on the ridge of the maxilla at the points marked (Fig. 4, C).

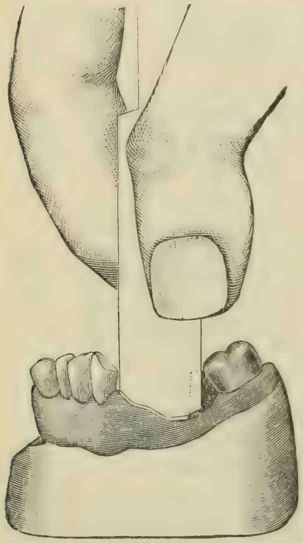
Having flattened out the pattern, cut by it a piece of gold (twenty-two or twenty carat, 30 gauge), but about one-thirty-second of an inch short of the free margin (Fig. 4, A). Along the edge of this sweat a piece of pure gold, and trim this to correspond to pattern. Now bend the piece of gold, and burnish it to fit the tooth the same as the pattern originally did (Fig. 4, C). Placing a thin strip of mica between the two projecting ends of the band, adjust to it the cap and solder them together (Fig. 4, D).

Having reached this stage in the construction of the crowns for both abutments, place them in proper position on the teeth on the model. For constructing the dovetailed gibs, we select a piece of *perfect* three-cornered wire, one-half the width of the intended gib. From this cut two pieces a little longer than the length of the crown, each piece becoming one-half of the desired gib when it is attached to the crown.

It is now necessary to determine the exact position in which each gib shall be attached to its respective crown, so that when it is placed in proper position it should be absolutely parallel with the gib on its companion abutment, in order that the bridge should meet with no difficulty in sliding.

To determine this accurately, take the cardboard template already described in Fig. 5, and place it in position against the projecting ends of the band. With a thin-pointed knife-blade instrument draw a line along the edges of the template on the band of each crown. Having removed the crown from the model, close the projecting ends of the band tightly over a thin shaving of mica left between; then having placed a speck of flux wax just outside of the line marked on the projecting end of the band, with a pair of tweezers grasp from end to end one of the cut pieces of three-cornered wire, and having warmed it, tack it on to the projecting end of the band, true with the line marked out (Fig. 4, E); turn over the crown, and smearing another bit of flux in a corresponding place, attach the remaining piece of wire parallel to the one already in position. The crown is now invested so that the plaster and marble-dust imbeds and firmly holds the ends of the wire, leaving it, however, uncovered at its point of union with the band, to which it is now securely united by soldering. Remove the investment, and all the excess of metal; then with a file bevel the upper portion of the gib, leaving it somewhat cone-shaped, as seen in Fig. 4, F.

FIG. 5.



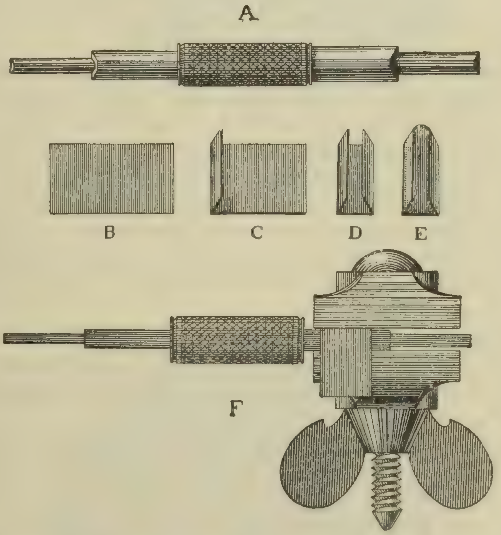
This shows the completed crown with the gib in position, so that it can be opened and closed, in which position it can be securely locked by means of the key (Fig. 4, G), which is made as follows:

For this purpose, an instrument devised by Dr. Andrews can be easily made by taking a piece of three-cornered Stubbs's steel and flattening the end of the triangle, which then makes the steel foursided, as shown in Fig. 6, A, in which illustration of this instrument there is shown the possibility of making four different-sized keys, as the size of the gibs naturally varies with the dimensions of different-sized teeth. Still, having the smallest-sized instrument required, from this a larger-sized key can be made by the exercise of ingenuity. Quite recently Dr. Andrews has devised a pair of pliers to be used in place of this instrument.

Proceeding to make the key, select a piece of clasp metal, 29 gauge, a little wider than the length of the finished gib, and square the ends with the sides (Fig. 6, B).

Having measured on this piece of metal, with a fine mark, the width of the side of the gib, secure the tool and the metal in a vise with the broad side of the tool on the metal alongside the line marked, as seen in Fig. 6, F. Now by simply turning this edge of the metal to fit the side of the tool, there is made one side of the key (Fig. 6, C).

Fig. 6.



Drawing the metal tight against the tool, turn it on its side in the vise and form the other side to the tool, the same as before, and remove any excess. Both sides of the key are now completed (Fig. 6, D).

The key is then placed over the gib, and carefully fitted to the same by means of a file. The cone is formed either by sweating a piece of gold on top and filing to shape, or by splitting the sides of the key to a point equivalent to the base of the cone on the gib. Then bend inward the two loose ends to form the cone, and solder them together, cutting off the projecting ends (Fig. 6, E).

The key is now entirely finished, and when in position securely locks the crown to the abutment, and the entire crown, with key in position, has the appearance depicted in Fig. 4, J.

Where the shape of the tooth used as an abutment permits of the construction of a crown entirely closed, the dovetailed gib is simply soldered at the proper position on the side of the crown, and no key is required.

Both crowns being secured in proper position on the teeth, you are now ready for the construction of the bridge. It is unnecessary for us to detail any portion of this except the extreme ends, as the main portion of the bridge can be constructed to suit any individual fancy, or the exigency of any particular case.

A piece of clasp metal, gauge 29, is formed into a slot to fit the gib, if it is on a closed crown, or the key of the gib if the side of the crown is open. This slot is constructed in a manner similar to the fashioning of the key.

Whatever form of bridge is used, it is contoured so that it entirely covers the sides of the slot, except about one-sixteenth to one-eighth of an inch of the gingival end of the lingual or palatal side, which in a triangular shape is left exposed (Fig. 1, C).

By bending this exposed triangular piece slightly inward, it forms a spring which should fit in a little bevel filed at the bottom of the gib. This effectually prevents the bridge from riding up and down in mastication, and is at the same time devoid of sufficient resistance to prevent the patient from removing the artificial substitutes or restoring them to place.

This method of bridging spaces where there is considerable overhang of the teeth, without mutilating them, has been in practice since 1892, and we can safely commend it to any one who is willing to do and capable of doing accurate work.

It would consume too much time to detail here all the various practical cases that have been constructed in this manner, and are at present a source of great comfort to the patients. Recognizing, however, the great value of illustrating any method of procedure by showing the results obtained in daily practice, we will close with the description of one other practical case.

Mr. B., aged about fifty-five, presented himself in October, 1891, suffering from pyorrhea alveolaris, due to a faulty nutrition arising from a combination of the loss of numerous teeth, together with an incipient diabetes.

In the inferior maxilla there were missing the right first and second molars, the two right bicuspids, also the two right incisors and the left central incisor ; the only natural teeth remaining on the right side being the third molar and the cuspid. In the superior maxilla all the molars had been lost, and the right second bicuspid.

There was considerable exudation of pus from all the inferior teeth, while the right inferior third molar was very loose, portions of the root being exposed, and it had commenced to tilt forward.

He found plates very unsatisfactory ; and although artificial substitutes on rubber were immediately inserted, so as to give him, if possible, an occluding surface on which he might properly masticate his food, it is questionable if he used them sufficiently at his meals to benefit him much.

The local treatment of the pyorrhea alveolaris was very protracted, and attended by a necessity for extreme patience as to minute details, and when he left shortly after for Europe, to take the Carlsbad cure, the condition of the gums was not entirely satisfactory. On his return, it was discovered that his health was improved and the pyorrhea had certainly gained no headway.

The two bridges for the inferior maxilla were at once constructed and I now show you a zinc model of the inferior maxilla having in position two removable bridges (Fig. 7) constructed in a manner similar to those which he has now been using for one year.

You will notice by the cast that there are used three abutments, the third right molar, the right cuspid, and the left lateral, with a half cap over the left cuspid. The right cuspid acted as a double abutment for both bridges. The pulps in all the teeth are living, and while there is a great overhang of these teeth, there has been no mutilation of any portion of their structure. The remaining teeth in the inferior maxilla were very much shortened by attrition, and these were extended by means of fillings of gold and platinum.

FIG. 7.

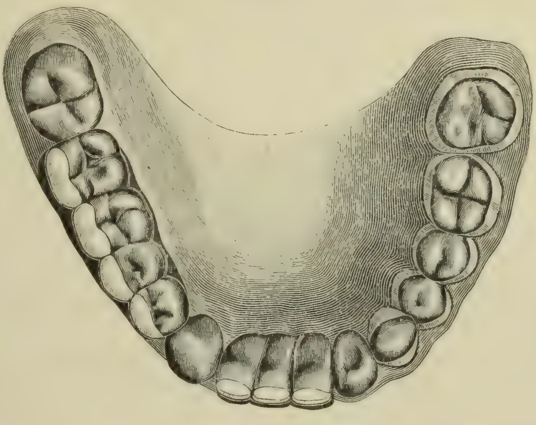
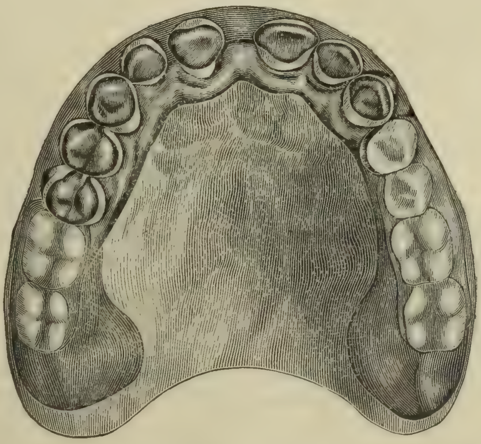


FIG. 8.



The zinc model of the superior maxilla shows him to be wearing a plate which does not extend over more than one-eighth of an inch on the palate, leaving the entire roof of the mouth free from any foreign covering. The plate is held in position by clasps around both bicuspids, and by a perfect adaptability to the parts, especially at the posterior ends (Fig. 8).

The general health of the patient has not only been vastly improved by his ability to properly masticate food, but he has lost every vestige of pyorrhea. The last lower right molar is especially worthy of attention, because of the marked improvement in its stability since it has been held so securely in position.

THE CARE OF THE TEETH TO THE FIFTEENTH YEAR.

BY SAFFORD G. PERRY, D.D.S., NEW YORK, N. Y.

(Read before the Second District Dental Society of the State of New York, December 11, 1893.)

A LENGTHY monograph could be written on the care of the teeth up to the fifteenth year. I shall only attempt to consider briefly some of the most important points.

Commencing between the third and fourth years, I will go over the teeth somewhat in the order of their eruption.

In the successful management of little children there is a condition that precedes wisdom and antedates experience, and that condition exists in the heart rather than the head of the operator.

The rude instrument is tempered with gentleness and made a means of mercy in the hands of one who has a deep love for little children, and an operator who has little ones of his own, and whose heart in consequence is kept warm and sympathetic, will be more likely, all other conditions being equal, to be successful in saving the temporary teeth.

In caring for the temporary teeth, the heart should be full of love; in managing the permanent ones, the head should be full of wisdom. In other words, a cold, scientific method cannot be strictly applied to the care of the temporary teeth. The selection of filling-materials and the manner of using them may not be of much importance in teeth that are to last at the most eight or nine years, but in those that are to last a lifetime, the materials selected and the manner of using them may tax to the utmost the ripest powers of the best minds in our profession. It is doubtless true that many operators look with indifference upon the temporary teeth. This probably arises from the fact that these teeth, as the name implies, are temporary, and seem of less value, and while to work upon them is not exactly a waste of time, yet it is somewhat like writing in the sand,—a short time elapses and all trace is gone!

One can forgive a grown man for sometimes feeling impatient at having to spend his time excavating and filling little cavities in a baby's teeth, when he might be engaged in more responsible and important professional work; or when, with his experience of the world, and his knowledge of business principles, he might be at the head of some great business enterprise.

There are operators who take but little interest in children, and consider that until their permanent teeth need attention they are suitable patients for the assistant. They are annoyed by the timidity, the restlessness, the inquisitiveness of childhood, and persuade themselves that they are wise in reserving themselves for the permanent teeth.

There are still other operators, and many patients who, considering the cost, and the pain to the little ones, mutually agree to reserve the labor and expense for the permanent set.

In a first-class city practice the question of expense is not, perhaps, a very important factor, but outside of the large cities it is important, and necessarily and justly must be considered in deciding upon the treatment of the temporary teeth.

In beginning with a family of children, it is well to have the little ones brought for an examination before there is much chance of work being required, so that they may go away with pleasant recollections of the operating-room. In fact, the whole training of a child with the temporary teeth should be preliminary to, and should lead up to, the proper care of the permanent teeth when they shall be erupted. A child well trained with the temporary teeth, which are not as a rule very sensitive, will be unconsciously well prepared to bear the harder work which will be needed in the permanent ones.

In operating for children, the first necessary condition is to get their confidence. When that is secured, the battle is more than half won. This will not be accomplished if the operator insists in all instances on doing thorough work. To excavate all cavities thoroughly, and to fill them accurately, may cause so much pain and may produce such an effect on the nervous system of the little patient, that the object sought—the salvation of the teeth—may be entirely defeated. The child, not yet old enough to be reasoned with and to exercise self-control, rebels, or, if of a patient nature and desirous of being submissive and obedient, gets into a hysterical state and makes a scene, and with the work unfinished is taken away by the parents, who declare that the teeth shall be lost rather than have their darling made so unhappy.

Instead of insisting, with the manner of a schoolmaster, on thorough excavation, it is better to prepare the margins of the cavities with a light touch and a sharp instrument, cutting always slowly instead of rapidly and nervously, and, when necessary, leaving much of the softened and decayed tooth in the bottom of the cavity. If the margins are well prepared, and creasote or nitrate of silver is applied to this softened dentine, and the cavity is filled with oxyphosphate, decay does not progress to any great extent under the filling. At the end of six months or a year, when the filling is considerably worn down, it can be all taken out, and the cavity can then, in most cases, be painlessly excavated and filled in such a manner and with such materials as to last, perhaps, as long as the tooth will be needed.

In excavating cavities for little children, I go as far as I can without producing a state of great excitement, but rather than abandon the teeth I fill them in this imperfectly excavated condition, and generally with the results above described.

Sometimes, however, if a child from three to five years of age is brought to me with the conditions of the mouth so destructive and the teeth so badly decayed that they cannot be saved without an immense amount of work, and by keeping at work upon them until the permanent teeth come in, making a martyr of the little tot, I deliberately advise the parents to let them go unfilled. But I do this with the understanding that not only the teeth, but the roots also, shall not be extracted. I had rather have the child's mouth filled with decayed teeth and roots, accompanied, as they sometimes are, with disturbed gums and unpleasant breath, than have them taken out, and let the first permanent molars slip forward into their places.

Some of the most perplexing cases of irregularity I have ever seen have been produced in this way. I will not say that temporary teeth in front of the temporary molars may not sometimes be extracted, but I emphatically declare that the second temporary molars should not be taken out until the first permanent molars are in place and the second bicuspids ready to come in. I have no fear that even the diseased roots of the temporary teeth, if left in, will do harm to the second set. I have never seen such harm.

It may seem like shirking one's duty to abandon a set of badly decayed temporary teeth ; but nature is not altogether unkind, and decay is so gradual and so unaccompanied by extreme sensitiveness in the temporary teeth, exposure of the pulps even being so often painless, or if painful so amenable to simple treatment, that I have little hesitation in advising the deliberate abandonment of teeth that are so badly decayed that the child must be made a martyr of if the attempt be made to save them.

A child with unfilled temporary teeth can be dismissed to the seashore or the mountains with very little danger of having pain which cannot be controlled by some simple remedy which any mother would know how to apply. But let a child with the temporary teeth all filled go beyond the reach of the dentist, and have a pulp die or a dead tooth ulcerate, and see how pitiable and helpless the case is. It makes the heart ache to think of the helplessness of a little sufferer under such conditions, and it should make one pause to ask if dentistry, after all, is an unalloyed blessing, practiced as it is by so many who are without heart or judgment.

In making examinations, and in operating on the temporary teeth, one most important fact should be kept in mind,—namely, that, if possible, no cavity should be allowed to become so large as to expose a pulp.

This should be looked after in order to avoid the danger of future abscesses, as well as to insure the natural absorption of the roots on the approach of the permanent teeth. Of course it is well known that the roots of dead teeth are not absorbed, as is the case with the living ones.

If a pulp which has not been aching becomes exposed in excavating, I promptly cap it in the manner so long since described by Dr. Jack,—filling a little saucer-shaped cap of platinum with a paste made with the oxid of zinc and carbolic acid and oil of cloves, equal parts, placing this over the exposed point, and then filling the cavity with oxyphosphate. The metal cap prevents pressure, and the paste sterilizes the exposed point and allows healing by first intention. These little caps, as you know, are made by rotating a round-faced burnisher with pressure on a piece of thin platinum, which rests against a piece of soft wood. They are then cut out with a pair of curved scissors, and kept on hand of different sizes, ready for use.

If the pulps have been long exposed and aching, then I destroy them in the usual way ; but after their removal I do not undertake to fill the roots to their extremities with any solid filling-material. It is quite likely that in this respect my practice is not like that of most operators. In the first place, I do not believe in filling roots unless it can be done so perfectly as to stop all germ action ; and in the second place, I do not like to put in a filling that cannot be easily taken out. I take out the pulp and its canal extensions as well as I can, and then fill the canals, and sometimes even the pulp-chamber, with cotton saturated with iodoform. Occasionally I use oxychlorid of zinc instead, but I do not mix it so as to make a hard filling, but only use a little of it entangled in the cotton so as to get its antiseptic effect.

In case of trouble, after the filling is removed from the cavity of decay, this cotton is easily pulled out of the roots, and relief usually ensues promptly. In impending trouble I have very many times passed a small bur under the gum on the buccal side into the pulp-chamber, but this is not very satisfactory if the cotton is closely packed, as vent is not secured.

In some unpromising cases I have put a piece of metal over the opening into the pulp-chamber, filled the cavity of decay, and then promptly drilled a small vent hole from under the gum into the empty pulp-chamber.

Sometimes I have proceeded in this way, but have omitted drilling the hole, leaving that operation to be done only when needed. But in all cases where the hole is not drilled, I put into the pulp-chamber a few fluffy shreds of cotton carrying iodoform. The cotton is only used to convey the iodoform, and is so loose that if the tooth is ever drilled it does not prevent a prompt ventilation of the pulp-chamber.

In selecting a material for filling the ordinary cavities in the temporary teeth, there are several conditions that should be regarded. For instance, in cavities on the grinding-surfaces of the molars, for children who will not allow thorough excavation, I almost invariably use oxyphosphate. If the edges are fairly well prepared, this makes a filling which will usually arrest or delay the destructive action, even though considerable decayed dentine is left in the bottom of the cavity.

On the approximal surfaces I generally prefer gutta-percha for these partially prepared cavities, as it does not wash out near the gum. Sometimes, as with the permanent teeth, I use gutta-percha near the gum and oxyphosphate near the grinding-surface.

On the grinding-surfaces of the temporary teeth, if the cavities are large, the teeth of good quality, and the little patient will allow thorough excavation, I usually fill with amalgam, wiping away the surplus mercury from the surface of the filling with a little mass of well-annealed crystal gold.

If the cavity is small, so that not much surface is exposed to attrition, I fill with tin foil. Under certain conditions I consider this the most beautiful material ever used for filling teeth. It is a constant wonder to me that the profession does not seem to appreciate its value. In searching for other materials its importance seems to have been overlooked.

Of course, I fill a great many of these large and small cavities with oxyphosphate, expecting to renew it when it has worn down.

On the approximal surfaces I am as careful about the restoration of contour as with the permanent teeth, for I consider it important that the little patient should be able to eat without the annoyance of the crowding of food against the gum. Occasionally I pack a single piece of gutta-percha into two adjoining approximal cavities, binding the two teeth together. The elasticity of the gutta-percha allows this, which would not be the case with the oxyphosphate or with amalgam. Either of the latter substances would break out from one cavity or the other, owing to the constant movement of the two teeth, and the rigidity of the materials.

I quite often apply the rubber-dam to the temporary teeth, and when approximal cavities are to be filled I find it of great value, not alone in keeping the cavities dry, but by allowing the use of different obtundents which can thus be kept off the gums. It also allows the neat use of nitrate of silver before filling. This I consider a preservative, as so well pointed out by Dr. Stebbins in the *International* for October, 1891, though I use it somewhat differently from the manner described by him.

Long after I abandoned the Arthur system as applied to the permanent teeth, I continued its use with the temporary ones, but never except in cases where a firm point of contact could be left, to hold the teeth in position and protect the gum. For many years I have abandoned all such cutting, except on the approximal surfaces of the temporary incisors, where I sometimes apply Dr. Arthur's system.

On all approximal surfaces of temporary molars I cut down, even for small cavities, from the grinding-surfaces, leaving as much as possible of the side walls standing, and then fill up flush, so that the perfect shape shall be preserved. I do not often cut in from the buccal or lingual sides, because the temporary teeth are, as a rule, very short. I take great care that no space is left into which food may crowd and be forced against the gum. Formerly, in cases presenting previous to the eruption of the first permanent molars, I often ground away the posterior surfaces of the temporary molars, leaving an abrupt shoulder at the gum, which was to hold the first permanent molar in place but leaving its front surface free. This sometimes worked well, but not always by any means, for many times the first permanent molars would tip over against the cut surfaces and cause their decay, besides moving toward the front of the mouth and crowding out the bicuspids, which were yet to come.

After all these years of beating around the bush in the hope of finding some easier way to escape the dangers that beset the teeth, I have settled down to the belief that in developing a denture for a growing child the safest way is to follow the plan laid down by Mother Nature when she works at her best. In doing this, I keep two distinct objects in view,—namely, the preservation of the shapes of the teeth, so that comfortable use of them is assured, and the keeping of even the roots of the temporary teeth in position, so that the first permanent molars shall be held back in their proper places until the bicuspids are ready to come in. When all resistance or obstruction is removed, there is a marked tendency of the permanent molars to drift toward the front of the mouth, a fact which may be overlooked, particularly by young operators.

Dr. Dwinelle once told me that he had seen a first permanent molar which had drifted forward until it stood tightly against the cuspid. At the time the first permanent molars are coming in, if there is no obstruction in front, they drift forward with surprising rapidity.

In filling the approximal surfaces of the temporary molars, when the grinding-surface enamel has had to be cut away, leaving large openings into the cavities, I get a quick and excellent result by the use of hand matrices, which enable one to keep the shapes of the teeth, and which save the trouble of finishing off the fillings near the gum and on the entire approximal surfaces. I exhibited these matrices before the New York Odontological Society last April. They are kept in place by a handle which is held in the left hand, and they are of great value when operations have to be made quickly for restless patients. They are of equal value applied to the permanent teeth.

In preparing these cavities on the approximal surfaces for gutta-percha, it is well to avoid as far as possible cutting away much of the plate of enamel on the grinding-surface ends of the teeth, as this is of great value in protecting the fillings from rapidly wearing away. If gutta-percha is used in small pieces, and packed somewhat as gold is, it can be inserted through rather small openings, so that much loss of this enamel is not necessary. In such cases, of course, no matrix can be used.

Before leaving the consideration of the temporary teeth, lest I may be misunderstood, I want to repeat that I advocate the imperfect preparation of cavities only in cases where the teeth are very sensitive, and the little patient is nervous and unmanageable, and when, if that humane plan were not followed, the task would be too great for both patient and operator. These imperfectly prepared cavities are greatly benefited by the nitrate-of-silver treatment.

We come now to the consideration of the permanent teeth. Naturally, according to the order of their development, we shall be concerned first with the lower first permanent molars.

With all families regularly under my care, I aim to have each child well in hand and in good training by the time these teeth appear. Without waiting for the teeth to get well through, I make a careful examination of all the fissures in the crowns. To do this, I often lift the flap of gum which commonly lies over the posterior portion of the grinding-surface with a peculiar instrument made for the purpose. If I find a soft place, even if it is not a pronounced cavity, I clear it out with a round-pointed instrument which is like a probe or examining instrument, and fill with oxyphosphate or tin foil. I make very little attempt to cut out or prepare these little fissures, because at that time they are imperfectly calcified, and the tissue is so soft that quite a cavity could be easily made. A round-pointed instrument is all that is required for scraping out these fissures if they are to be filled with oxyphosphate.

A year later, when the tooth has grown out of the gum, and the filling nearly washed out, the border of the fissure will be so well calcified that a real filling may not be required. These teeth at this time do not antagonize with the upper molars, even if they are erupted, which they generally are not ; so that the entire crown can be covered by the filling, and all its fissures protected, whether they show signs of softening or not.

For many years it has been my habit with soft teeth to wash out these fissures and put a pat of oxyphosphate in them, even if they are not softened at all. If they are dried out, the filling will usually stay, even if no cutting has to be done. This serves as a protection while the gums lie over the ends of the teeth, and while they are still unused in mastication. When the tooth gets well through, and is antagonized and used, the danger of softening of the fissure is greatly lessened. When the upper molars are through they are treated in the same way.

Later, after the lower molars are well developed, the little fissures on the buccal sides are to be carefully watched. If these are deep enough to catch the instrument, cavities must be made which will always have to be kept filled. There is no chance on this surface for the same kind of protection that can be given on the grinding-surface, pending the calcifying process. Here it must be a cavity for all time, or not at all. These little buccal cavities can often be filled in a few moments with tin foil, in such a manner as to last many years. I almost never make any attempt at this time to fill them with gold, for the reason that I think I can fill them better with tin. If the child has not been brought soon enough, and cavities on the grinding-surfaces are of considerable size, I fill them almost invariably with tin or oxyphosphate. Sometimes, and for reasons which cannot be easily made plain here, I fill them with gutta-percha, but not very often with amalgam, and certainly not very often at this age with gold.

Although not quite in the order of time, it may be well here to dispose of the anterior approximal surfaces of these teeth. While the last temporary molars are in place these surfaces must be watched most carefully, and the slightest sign of decay must be regarded. I fill on these surfaces almost invariably with gutta-percha, as on all sheltered approximal surfaces. I believe this material will last longer than any other of the plastics. But when the baby molars are lost, and the anterior surfaces of the sixth-year molars are exposed, I almost invariably fill with gold, and in the most careful manner, and always strictly with regard to the natural shapes of the teeth, being careful to bulge the fillings out to a full contour, so that when the second bicuspids grow up they will rest against the fillings and as little as possible against the teeth. This operation is often difficult to perform. It is the first serious one the child has been asked to submit to, but there is no escape from it, for never again will the surfaces of these teeth be so favorably exposed and the opportunity given for the performance of so perfect an operation. If left until the second bicuspid is in place, then, of course, the teeth must be separated, and it will not be possible to reach the entire surface in so satisfactory a manner.

For this operation the rubber-dam is of course applied, and after the actual decay is removed, the whitened, partially decalcified margins of the cavity are beveled so as to allow of extending the gold filling out on all sides beyond the real margin of the cavity. If the entire front surfaces of these teeth can be covered with gold, of course they will be safer when the bicuspids are in place against them.

The performance of this operation may mark the first real encounter with the young patient. If there has been gentleness and leniency before, there must be firmness and thoroughness here. But of course the patient is old enough by this time to bear such an operation, and to understand its significance and importance, and it is not often that one cannot, with the use of such obtundents as we now have, perform this operation in a perfectly permanent manner.

It seems to me that whatever may be said in favor of plastics before the fifteenth year does not apply with equal force to these approximal surfaces. In the first place, as before mentioned, they can never again be so well reached ; and in the second place, they have been standing during several very dangerous years in contact with the baby molars, and if not actually decayed, their surfaces are likely to be more or less softened and in a condition favorable to decay soon after the bicuspids are in place. Gold is the only material that can be carried out to a thin edge over these beveled margins with any certainty of its staying where it is placed. I instruct all parents to promptly bring their children when the posterior baby molars are lost. If they are careless about usual examinations, I beg them to be careful about this.

On the buccal surfaces of the first permanent upper molars, cavities sometimes occur which extend around partly on the posterior approximal surfaces. These cavities I usually fill with tin or gold before the appearance of the second permanent molar, and also for the reason that the posterior surface can never be so easily reached after the latter molar is in place. The posterior aspect of these buccal surfaces is very apt to be decayed before the second permanent molars are in place. The careful polishing of these surfaces, if promptly done, coupled with special directions for careful brushing, will often save them from decay.

"You must brush your teeth more," is advice that, given in the usual way, generally goes in one ear and out of the other, with the average patient of this age. But often a few earnest, impressive words, expressed with tact, will work wonders with some patients. The young mind is impressionable, and doubtless we do not always realize the effect a few earnest words may have. But they must not be expressed with the manner of a schoolmaster. If the young patient is complimented with the assumption of possessing intelligence, and that intelligence is appealed to in a persuasive, convincing way, the seed may be sown in productive soil that will bring forth more than an hundred fold. And this education of our young patients to an appreciation of the value of proper care of the teeth is as much our duty as to fill their teeth properly. I am sure most of us are too negligent on this point.

We must now go back several years to take up the superior permanent incisors. When these teeth are decayed on the approximal surfaces, one is brought face to face with a serious problem. The question is, To what extent shall gutta-percha, oxyphosphate, or tin foil be used? I must say to you frankly that in most cases I use one or the other of them in preference to gold. Of course, I shall expect to be criticised by many for this, but I must be governed by the results of my own observation, and I have seen so many cases where gold fillings have so quickly failed, particularly when made soon after the teeth are erupted, that I have grown very shy about the use of gold at this time. At this age the teeth are so soft that even little cavities have to be enlarged to get the firm margins required for gold fillings, and when failure comes there must follow a still greater enlargement, so that by the time the child has arrived at twelve to fifteen years of age, by which time several renewals may have been required, large cavities exist.

If, instead, the teeth, when softened and slightly decayed, are opened with a separator, polished with a fine sand-paper strip, the little cavities cut out, *not too thoroughly*, and filled with a good quality of gutta-percha, or sometimes with tin foil, and several renewals of these fillings made up to the fifteenth year, the chances are that the cavities will not be as large as if gold had been used. If as large, it is safe to say they will be no larger. There is still the advantage that not so much work has been done, and not so much expense incurred. Of course, if the teeth are of first-class quality, this does not hold true to the same extent as in those that are very soft, and in mouths that are destructive. The failure of a gold filling necessarily implies increase in the size of the cavity. The failure of a gutta-percha filling does not, by any means, imply such an increase. It fails from waste of substance of filling, and not from increase of cavity, and the same is true, to some extent, with a tin foil or an oxyphosphate filling.

I have come to have very pronounced opinions on this question of selection of materials for young, soft teeth. Having had to manage a large practice for many years, I have often been forced from lack of time to adopt this plan of treatment for temporary purposes, but I have seen such good results from it when applied in this way that I have come to regard it, under certain conditions, as the very best practice for permanent purposes. I could show you cases where the bicuspids and molars are contoured with gold in the most elaborate manner, and yet on the approximal surfaces of the incisors only gutta-percha has been used for the last ten or fifteen years. Many renewals of the gutta-percha have, of course, been made in all this time, but there has not been an increase in the size of the cavities, and the teeth present a better appearance than they would if filled with gold. These fillings are in the mouths of most particular patients, who expect the very best treatment. The silk is used daily, the approximal surfaces are kept clean, and decay does not recur around these fillings. In making the renewals, only a few moments are required. A separator is applied, and space enough gained for passing a thin emery silk strip for finishing. After the filling is inserted, a piece of floss silk wet in chloroform is passed between the teeth, and the thing is done. Why should I fill these teeth with gold, when year after year shows no increase in the size of the cavities, and the patients greatly prefer to have them as they are? Of course, these are extreme cases, but they serve to show what can be done when great care is applied to this kind of treatment.

The next teeth in order are the second permanent molars. The fissures in these I treat in nearly the same manner as those of the first permanent molars.

The next after these are the bicuspids. The fissures in the crowns of these I also treat in nearly the same manner,—that is, I fill them with oxyphosphate or with tin foil, mostly with the latter. In cutting out and preparing these fissures, as well as those in the molars, I am careful not to make large holes. I usually cut them out with extremely fine excavators, and aim to make the fillings as small as possible. If I use the engine for these, it is with only the minim burs, which are of course the smallest in the market. The engine is a savage instrument, and there is great danger, in its use, of cutting larger holes than are necessary. The teeth are priceless structures, and should be operated on with a feeling akin to reverence. This feeling is not much encouraged by the use of these modern dental saw-mills, which in steady hands may be safe enough, but which in unsteady or unwise ones may do an immense amount of mischief.

If the teeth are of good structure and the margins of the fissures hard, I fill them with gold once for all. With these teeth, as well as with the second permanent molars, we are dealing with a child older and more manageable than when the first permanent molars first required attention, and there do not exist quite the same reasons for the use of plastics.

We come now to the approximal surfaces of the bicuspids and molars. As with the corresponding surfaces of the incisors, we have to meet a question not easily disposed of. To a certain extent, with cavities to the fifteenth year, I follow the same plan as the one I apply to the incisors. If the teeth are very soft and the cavities very little, I almost invariably open them with the separator, polish the approximal surfaces with the sand-paper, and cut out the decay and fill with gutta-percha or tin foil, being careful to in no way injure or change the contour of the teeth. In doing this I cut in from the buccal or lingual side, or down from the grinding-border, though I avoid, if I can, going through the enamel on the grinding-surface.

If the tooth is of fair quality, and the cavity so large that the enamel on the grinding-end is already crushed in, I treat it somewhat as I do the anterior surfaces of the first permanent molars,—namely, fill promptly with gold in the best possible manner. Such cavities, when filled, would leave but little of the tooth standing in contact with its neighbor, and there would not be much danger of a renewal of decay.

The reason for adopting this course lies mainly in the fact that the grinding-surface being undermined and destroyed, there is no protection to the gutta-percha, and an attempt to follow this line of treatment would necessitate such frequent renewals that what might be gained in one way would be lost in another. Let me say here that I use the oxyphosphate very little on the approximal surfaces, and for several years, I may say, not at all without putting a layer of gutta-percha to the extent of about a quarter or a third of the cavity, next to the gum.

Let this point be noted carefully : Oxyphosphate is the most dangerous and treacherous filling that can be put in on an approximal surface, unless it is intended to be, and unless it is sure to be, for the most temporary purpose. In advocating this plan of practice pending the solidification of the teeth, if it involved the use of oxyphosphate alone, on large approximal cavities, I should be preaching a doctrine fraught with the gravest dangers. Oxyphosphate, rightly used, is one of the best materials we have, but, with copper amalgam, it is responsible for the loss of an innumerable number of pulps, owing to undetected and treacherous chemical solution and waste along the cervical borders.

The safeguard against the danger of copper amalgam is never to use a particle of it under any circumstances. The last use I made of it before I excluded it from the office entirely, was in the small fissures of the grinding-surfaces of the molars. It does well in these places, but it wastes away somewhat like the oxyphosphate, though not so rapidly, and it discolors the teeth. I cannot imagine a fissure that cannot be as well filled with tin foil, even if it has to be done under water. Copper amalgam has caused me so much vain regret, and so much humiliation, that I cannot think or speak well of it for any place in the mouth. In its present state of uneven and uncertain manufacture, I think it best to exclude it entirely. The safeguard against the danger of oxyphosphate lies in the use of gutta-percha along the cervical borders. This combination makes a very good filling for the approximal surfaces in young, soft teeth, or for frail, badly-decayed teeth of any age. In these approximal cavities, which have lost the enamel on the grinding-surface border, I have often used gutta-percha alone, protecting it from rapid wear by plunging into it a warmed platinum pin from an old rubber tooth, the head of which has been beaten out flat, and given a somewhat triangular shape corresponding to the outline of the grinding-surface aspect of the cavity. This stops the wear, and many times gives a good result.

A gutta-percha filling is not treacherous. It fails by wearing away on the surface, and that very deficiency brings the patient back with the fear that a filling is out. But the operator can possess his soul in peace, knowing that there is no danger to the tooth, because the wearing away of the filling brings the patient back in ample time. Had it been a filling of oxyphosphate, the patient would have been sailing on a happy summer sea, unconscious of the rocks beneath, and when brought back to the dentist by an ominous growl it would then be found that it was too late to avert all the ills that follow the exposure of the pulp.

Before I leave this interesting subject of the development of the teeth,—for that is what it is,—Nature supplying the underlying force, and the dentist giving it, as the case may be, wise or unwise direction,—let me say, that in all the operations I have described or hinted at, both on the temporary and permanent teeth, I have had one fundamental idea in mind, although perhaps not before so clearly expressed, and that idea has been the *perfect preservation of their natural shapes*. From this I allow no deviation except in the case of temporary incisors, and in a few instances upon the posterior sides of the last temporary molars, but not until the first permanent molars are in place. Only with these few teeth do I admit that there is any advantage to be derived from the Arthur system.

Now, to sum up: This paper may seem to be a plea for plastics. So it is, to a certain extent, to the fifteenth year. But there is great opportunity here for misapprehension. Please note that I do not advocate this to the same extent when applied to teeth of good quality, in mouths which are not what may be called destructive; and please notice also that I admit that it is a dangerous practice if carelessly applied. It begets an easy habit of putting off until to-morrow what might be done to-day, and with careless patients, who do not return for frequent examinations, it may result disastrously. But it contains a principle of practice of great value, and one which applies with peculiar force to the very best class of patients that can be found anywhere,—that is, patients who can always be depended on to come at stated periods of the year for careful examinations. I have never yet seen a patient so rich or so exacting that I have not, under certain conditions of the teeth, promptly applied it as I would and do for my own children.

Instead of being a careless practice, it is a most careful one, and is susceptible of conferring a great benefit on the patient, and of being a great relief to the operator. It saves pain and expense, and renders the practice of dentistry bearable to both patient and operator.

Patients often remark what a difference between the gentle practice of to-day and that of the time when they were children. It was then a nightmare; it is now, not a pleasure, but it is at least bearable. Some patients, before they comprehend its advantages, may think it a careless, lazy practice, and some dentists who do not look below the surface, but run on in the old groove, may consider it a makeshift; but these are enlightened days, and it has been my experience that most patients have a great deal of horse sense, and when taken into one's confidence, and told in a few frank, honest, earnest words the reasons for this practice, they readily acquiesce.

At about the fifteenth year the teeth have become so hard that the question of the use of gold must be seriously considered. After this time many of the arguments I have made vanish into thin air. Yet I must say that I carry along quite a number of people in moderate circumstances for whom I apply this practice, about as described, until far beyond the fifteenth year, and some for whom I continue it indefinitely. When second childhood approaches and the senile condition appears, it applies again with equal force,—I might almost say, with greater force in some cases. Some one has said that there is an eternal fitness in things throughout the universe. Since teeth must decay, how fitting and fortunate for humanity that we have such beautiful materials as gutta-percha, tin foil, and oxyphosphate! If I do not couple amalgam with these, it is not because I do not use it, or because I have not respect for it, but rather, perhaps, because I cannot take quite the same pleasure in its use. It is not one of my pets,—it is one of my necessities. I do not include gold, because that is peculiar, and stands by itself, unrivaled still when used in its proper time and place.

The work of developing a set of teeth for a growing child is the most satisfactory of any professional work of which I have any knowledge. The physician, bowed with the fearful responsibility of life or death, gropes more or less in the dark, uncertain if his medicines really kill or cure. His problem is so complex that there must always remain a doubt, and though he has all the wisdom of all the ages, his patients must finally die. The surgeon, with better opportunities for exactness, and with the inspiration that springs from the more than marvelous advances that have been made in these recent years, cannot always make his patients live. But the dentist, full of reverence for the way in which Nature works, and recognizing the hindrances that prevent the fulfillment of her perfect purpose, can, by his deft fingers and steady brain and loving heart, give such aid and direction to her efforts, that his life-work may be a perpetual blessing to those who intrust themselves to his care.

MANAGEMENT OF CHILDREN IN DENTAL PRACTICE.

BY META TUDOR HALEY, D.D.S., WEST CHESTER, PA.

WITH no class of patients is the advent of woman in dentistry regarded with greater satisfaction than with children, and with no class of patients will she find a greater difficulty of success. Success in dental practice embraces the two requirements: satisfactory services from a professional standpoint for the patient, and the acquisition of a permanent patron for the practitioner; and while these conditions in adult practice usually stand to each other as antecedent and consequent, they do not to any appreciable extent exist in such relation in work with children. To retain the child as a permanent patient requires a special influence on the part of the operator, due in most cases to a knowledge of child nature, a recognition of its tendencies and requirements, and of the influences that operate in modifying them.

There are few old practitioners but have many times had the unsatisfactory experience of bridging over the period of childhood, doing such temporary work as was possible, and have found after all the worry and care and trouble, when the time had come for permanent work,—a time when the child's mind had arrived at nominal maturity and he had been allowed to choose for himself,—he had left them for some other operator, no more competent and probably less conscientious than themselves.

With the adult, good work is paramount, and this, combined with tact and gentle bearing, will in all probability accomplish the desired result,—oftentimes, indeed, without the last-mentioned conditions.

To deal with children in any capacity, we must direct our efforts from a psychological standpoint, and it seems to the writer that in no other capacity do we need to have a clearer conception of the nature of mind, a better knowledge of its development, and the related tendencies of its faculties. While we may not say that the child has been taught to fear a dental operation, we may safely assume that all he has ever heard on the subject at home or abroad has tended in that direction. To relieve the mind of this feeling, to eliminate fear and bring the mind to a realization of at least not more than the actual experience, is a difficult and not always a successful undertaking, but once accomplished it is a principal element in success with children.

The question arises, "How shall we proceed?" It is plain that the *modus operandi* must necessarily differ greatly, for though at all times we fight the same enemy, we attack him in a different stronghold each time, with a varying strength of forces and intrenchments. Then, too, each one of us must work along the line marked out by her own individuality. All, however, must start from the same basis,—a knowledge of the emotion of fear and a close study of its causes, relations, and effects.

The fear of physical pain is innate, and finds its expression in a manner corresponding to the temperamental tendencies of the individual. Pain from some actual infliction may be severe, but mere pain is not fear. It is only when the mind anticipates some painful infliction, still in the future, that we are liable to the emotion of fear. We must regard pain in two aspects, a mental and a physical. On the mental side we are to bear in mind the volitional element, or stimulus to the will ; on the physical side we must consider the associates of pain, the causes and collaterals that engage the attention during the period of irritated sensibility. These last are the distinguishing characteristics, and by them the pain may be afterward recalled. The revival of pain in idea is purely mental, and the conditions that favor this revival and subsistence increase the feeling of fear.

In a fully and harmoniously developed mind, where the intellect, the feeling, and the will are ideally balanced, the revived idea should exactly coincide with the actual experience. But this condition is seldom or never found in the adult mind. We do sometimes find the feeling so under the control of reason and will that the expression of fear, and indeed the fear itself, may practically disappear.

In the undeveloped mind of the child we cannot expect to find either of these conditions in any degree approximated. He is all senses, and the impressions received through the senses are modified largely by that mental faculty which predominates in each individual case. This predominance rests upon a basis of temperament, inheritance, and training. Once arrayed on the side of the operator, it becomes his most powerful ally. To recognize the trait, and use it somewhat as a key to the situation, presupposes a knowledge of psychological relations, and requires a quickness of perception, a nicety of judgment, gained only by a constant alertness and perseverance. This is a work in itself to the operator, and with many who view it superficially a " game scarcely worth the candle," presenting no visible compensation. But it is a work that cannot fail to broaden us, benefiting ourselves individually as well as professionally.

If we could get the child at a period when the first experience would be attended by a minimum amount of pain, the work would be comparatively easy. Where he has heard nothing of the terrors of dental work, the mere concentration of the attention may result very happily. If his mind is already a storehouse of the expressions of his grown-up friends, the situation still presents only a mental side, with the judgment in the balance and odds against us. In older children of a peculiarly sensitive organization, this last condition is one of the most difficult with which we have to deal. Having had no experience in this direction, their fear is of a new kind of pain. The excited imagination may conceive boundless misery. It shifts from one conception to another, rendering impossible the exercise of fortitude, accommodation, or resistance.

When the child has already had a painful first experience, and has sat with senses alert and nerves and muscles braced, a condition in which any sensation is magnified, we have a situation of more serious complexity. The imagination is our chief foe, but it may also become our chief friend. As it can magnify, so can it also minify. Though the reason is developed quite early in some children, it cannot be relied upon to any extent in this matter, and the will as a controlling factor will depend largely upon the training. The element of will may be used to advantage in the limitation of the period of restraint, making it in a manner a matter of choice to the child. This has been found an excellent device in overcoming the natural restlessness of childhood. A challenge to physical endurance may also work well with older children, if we are careful not to go beyond the prescribed limit.

A most important factor in the work is the feeling and attitude of the operator toward the patient. A child is a severe critic. His confidence is easily won, but it is as easily dissipated by any act of insincerity or lack of sympathy. Unfortunately, the parents themselves sometimes advise or request deception on the part of the operator, and while such must be treated with due deference, they should not influence to the point of yielding. Aside from the principle involved, yielding may turn not only the child but the parent from you. We will reach the parents through the children nine times, where we would reach the children through the parents but once.

Most especially must the operator be able at all times to recognize the limit of courage, and not go beyond it ; for once beyond, the child is entirely undone. He has lost confidence not only in the operator, but in himself. Patience is also one great need of the operator, and, unlike forbearance in the old proverb, seldom ceases to be a virtue. Sympathy judiciously expressed is a grateful panacea in distress, and an efficient spur in a struggle for victory.

Embracing all these, and hiding still in its unpretending brevity, a something without which all our efforts are apt to fall short of success, is tact. It renders available the knowledge gained through investigation and experience, adjusting the underlying plan to the opportunity. This underlying plan or principle, this driving-wheel which may set the whole train of mental machinery in related motion, is the force of positive suggestion. Designate it by what term you may, it is a wonderfully subtle power to which few minds are wholly unsusceptible. The delicately poised faculties of the child are easily swayed by its influences. Much has been said, and undoubtedly much remains to be said, on this subject. The one who discusses it from too material a basis is criticised in turn with him who advances it to spiritual infinities. It is a factor to be recognized in all dealings with individuals, a subject to be studied, though in this study we must remember that we are working with the very fabric we are trying to analyze or investigate,—an influence to be used cautiously, carefully, and intelligently.

ELECTRICITY IN THE TREATMENT OF RIGGS'S DISEASE.

BY SIGEL ROUSH, M.D., D.D.S., WASHINGTON, D. C.

ASSISTANT DEMONSTRATOR, DENTAL DEPARTMENT, COLUMBIAN UNIVERSITY.

In addition to the usual local and constitutional treatment of Riggs's disease, the writer has found electricity to be of great value in exciting a healthy condition of the tissues involved in this annoying affection. After carefully removing all traces of salivary deposits and injecting the pockets with some suitable stimulating antiseptic solution, the patient is dismissed and instructed to return in two or three days. Usually by this time the inflammation will have been somewhat reduced, the gums bleed less easily, and the general condition will have been improved.

In addition to the above treatment, the writer now applies electricity. An ordinary two-cell battery is employed, with one pole provided with a needle similar to those used by the dermatologist in destroying hair-follicles. To the other pole is attached a small, fine sponge. In applying the current the needle is inserted far up around the neck of the tooth, and the sponge is placed on the opposite side, so as always to direct the current around and through the tooth and socket. After a few moments the needle is withdrawn, and inserted again in another place, shifting the sponge so as to bring it always opposite the point of insertion. The needle is changed six or eight times until most of the circumference of the tooth has been reached. In these loosened teeth no difficulty and little pain will be experienced in inserting the needle. If pockets exist, a blunt point is used and inserted into the opening. Whether suppuration and inflammation exist, or simply absorption and loosening of the teeth, the writer has found this treatment beneficial.

Riggs's disease, whether a local manifestation of some constitutional diathesis, or whether a purely local trouble, is attended by a loss of tone of the alveolar and pericemental structures. It is associated with a low vitality of these organs, and electricity will impart life and tone to these diseased tissues quicker than anything the writer has ever tried. When the patient is anæmic, from whatever cause, hypophosphites, cod-liver oil, or some other tonic is prescribed. An antiseptic wash is always recommended, especially where pus exists. When the writer was an interne in one of our hospitals, electricity was employed successfully in cases of fractures where a bony deposit was not thrown down in sufficient quantities to cause a union of the parts, and it was this practice that first suggested electricity in Riggs's disease. In addition to stimulating the soft parts to healthy action, it seems to cause an increased deposit of bony material around the tooth, which results in firmly fixing it to the alveolus.

As an experiment, two teeth were treated, a right and a left bicuspid. Both were very loose. On one electricity was used, on the other stimulating applications of the usual drugs. In two weeks the one treated with the electrical needle was firm, and the other, while much improved, was easily moved in its socket. The two were extracted. The one treated with drugs alone came out easily, and presented a smooth root. The one treated with electricity was extremely difficult to draw, and brought away considerable alveolar process, which was so firmly attached to the dentine that a chisel and considerable force was necessary to scale it off. It is the opinion of the writer that electricity will cause a decided bony deposit around the root of the tooth, consequently rendering it firm in the jaw, besides giving tone and vigor to the soft parts.

TREATMENT AND EDUCATION OF CLEFT-PALATE PATIENTS.

BY NORMAN W. KINGSLEY, D.D.S., M.D.S., NEW YORK, N. Y.

THE only necessity for interference, in congenital cleft-palate cases, is to remedy the defective speech.

From time to time it has been asserted that the difficulties which the patient met with in deglutition would justify a surgical operation, but this is a mistake. Long before the child has reached maturity he has learned to accommodate himself to his unfortunate condition, and has acquired the habit of swallowing so well that it does not cause him embarrassment.

There is no other evil attending cleft palate except the difficulty of articulate speech, and this does not lie in the fact that one *cannot* articulate, but only that his articulation is necessarily different from that of people who have normal organs of speech.

The fault is not defective vocal organs, because the vocal organs are always as well formed, and in themselves as capable of perfect speech, as those of the rest of mankind. The difficulty arises from the inability of the patient to manipulate his voice in the production of the consonants, which form so large a part of spoken language. With the exception of intonation, the vowel sounds of articulate language are comparatively pure in these cases.

The effect, however, of an inability to articulate many consonants renders the speech in some instances quite unintelligible, and in all cases very disagreeable. But if all people were born with cleft palates, there would be no defective speech. The speech of mankind would then be made without the introduction of certain consonants, which now form a distinguishing part of all languages. Thus we see that articulate speech is not a normal function, but an acquirement of man as he evolved from an original speechless condition.

For treatment of congenital cleft palate both surgery and mechanism have been resorted to. Surgery was naturally first suggested. As operators became more and more skilled in their art, it was but reasonable to suppose that a complete surgical union of the split palate would cure the obvious evil. Staphylorraphy first became famous about the year 1820, through the skill of an American surgeon, Dr. Warren, of Boston. For many years thereafter the operation was regarded as one requiring unusual skill, and it became a favorite with ambitious surgeons desirous of distinction.

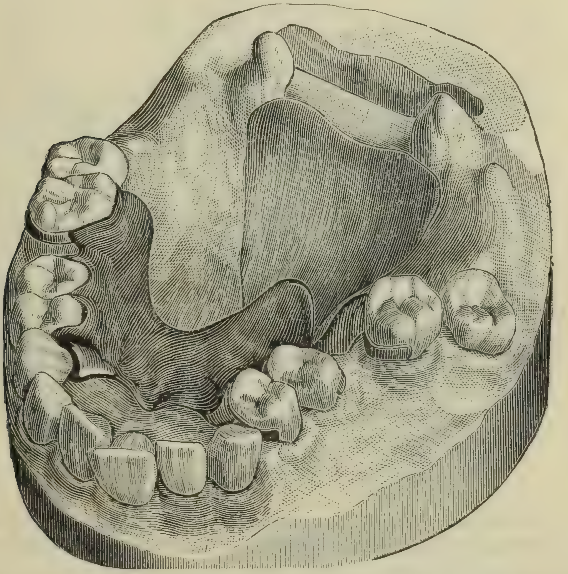
But surgery, after a full trial under the advantages of the most skilled artists for more than half a century, has disappointed expectations.

The cases are very exceptional where normal articulation is ever acquired with a surgical velum. To understand the reason involves a knowledge of the mechanism of speech; a knowledge of the positions which normal organs assume in the formation of consonant sounds. The palate plays an important part in this function. It serves to close the passage to the nasal cavity and to the buccal cavity, and also to split the voice as it issues from the larynx. Each of these operations changes the voice, thus producing different sounds, which form an essential part of all languages.

The surgical palate is incapable of all these actions. In many instances it is so tense and so short that it appears to be more of an interference than a benefit. Besides, surgery is limited in its application. No prudent surgeon would attempt to operate without what he regarded as an abundance of tissue, with which to bridge over the gap. Thus are excluded a large number of cases involving extensive fissures of the hard palate, for which surgery can find no remedy.

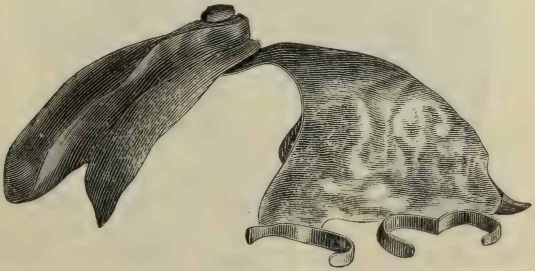
Mechanism, with all its objections, has produced the best results. Appliances are made sometimes flexible, or elastic, and sometimes rigid, or non-elastic. Flexible instruments have been made which perform measurably the physical functions, and quite fully the physiological functions, of the natural velum. Rigid appliances (obturators), while not performing the physical functions, nevertheless, in many instances, perform the physiological functions of articulation equally well. Any one who has had long experience in making such instruments, and noting the effects of both sorts of apparatus, will have seen abundant evidence that *neither kind of instrument is the best in all cases.* Each has its advantages, and there are objections to the universal application of either.

FIG. 1.



I make a distinction in name between the two kinds of appliances. Flexible instruments are "artificial vela"; non-elastic instruments are "obturators." Figs. 1 and 2 show the former, Figs. 3 and 4 the latter.

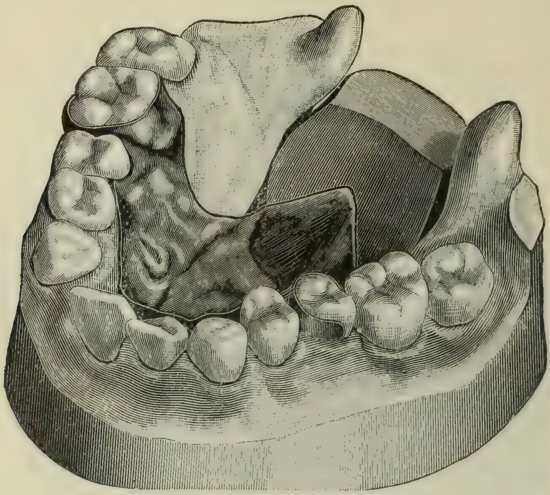
FIG. 2.



In the hands of a skillful artist of long experience, the flexible instrument is undoubtedly the best with which to *acquire* articulation, and were it not for the perishable nature of the material of which it is made, there is no case in which it should not be preferred. It imitates the form and action of the natural velum quite as well as artificial teeth imitate the shape of natural teeth and perform the function of mastication, and with it one can learn to articulate more readily than with an obturator.

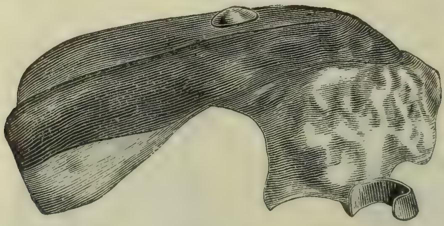
Obturators are simply plugs filling up to a greater or less extent the upper pharynx, or the posterior nares. When properly adapted they are especially valuable to supplement the use of an artificial velum, and in many cases their use would be justified as a primary instrument.

FIG. 3.



No rule can be given, or description made, which will indicate to the inexperienced which sort of apparatus is likely to confer the most help in any case. No study of a model of the parts involved will be of much advantage. It is only the experienced eye, watching the action of the muscular tissues in the remainder of the palate and of the superior pharynx, which will guide to a determination.

FIG. 4.



Nor is it at all possible, by observation of such action, to form any opinion of the effect upon the speech. That can be known only by hearing. With a personal experience of more than thirty years, and an observation of more than a thousand cases, I have failed to discover *all* the causes which are in force in producing mal-articulation. It is easy to discern physical causes, but the esoteric physiological causes are so remote that to me they still continue to be a mystery.

I have seen horrible deformities in the absence of the velum, the hard palate, and all the anterior part of the alveolar arch, including also the upper lip, where the speech was absolutely unintelligible. Fig. 5 represents the model of such a case. Here the inexperienced would readily find a cause for the mal-articulation. But I have seen very small clefts, fissures of the velum only, nasal passages normal, neither vomer, turbinated, nor palatal bones abnormal, and no hare-lip, where the speech was as defective as in the former case. Fig. 6 represents one of the latter class.

FIG. 5.

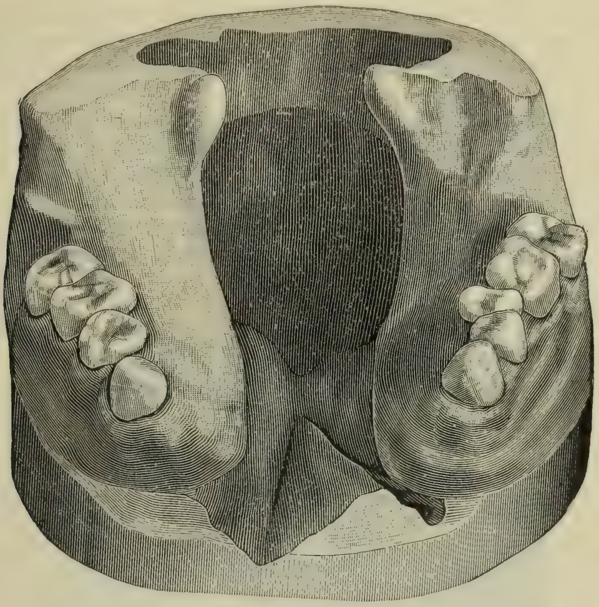
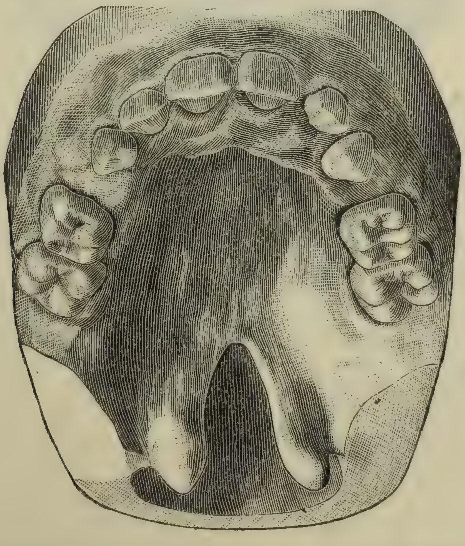


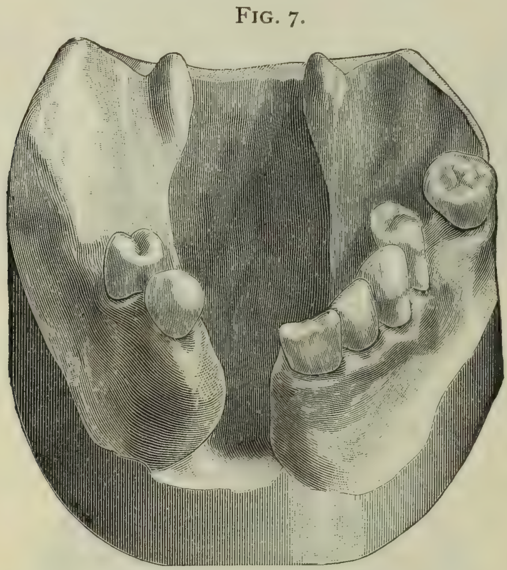
FIG. 6.



I have also seen an extensive fissure, involving hard and soft palates, a portion of the alveolar process, and a hare-lip, where but that the lip directed attention to the possibility of a palatal cleft, such a deformity would not have been suspected from the speech, except by the most critical ear. For ordinary purposes of life, and to the average listener, the speech was good. The only admixture was an occasional guttural sound, which does not belong to pure English. Fig. 7 is the model of that case.

Where a cleft palate does not reach the alveolar border, there is no apparent anatomical reason why the sound of "s" should almost invariably be absent; but it is a fact: and there is every anatomical reason apparently in all clefts for the inability to form the sounds of "k" and "g"; yet I have heard these sounds made with great distinctness, *without an instrument*, and without special training. Such cases, however, are very rare. The possession of an apparatus, of whatever nature, however cunningly conceived and skillfully adjusted to the needs of the patient, will not transform him immediately into a perfectly speaking person, any more than would the possession of a violin transform the possessor into a master of that instrument.

FIG. 7.



Articulate speech is an acquired function, and, being an acquirement, involves application and practice. An acquirement which so pre-eminently involves mental application must depend for its success largely upon the mental attitude of the applicant, and demands natural aptitude, as well as desire, determination, and perseverance. It is an imposition upon the credulity of this deformed class of people, undergoing constant mortification from their defect and terribly anxious for relief, to hold out the encouragement that they will certainly obtain relief by simply wearing an instrument. It is quite possible, and even probable, that if an instrument could be applied in infancy, the same faculty which enables the child to learn, without special instruction, to speak with normal organs, would lead him to the same result with an artificial organ; but the people with whom we have to deal rarely come into our hands until early infancy has passed, and bad habits of speech have become almost fixed. The muscles involved in the mechanism of speech have acquired improper actions in their efforts to make up for their deficiency, and so it follows that the majority of people, upon the introduction of an artificial palate, are handicapped by bad habits of speech which must be unlearned or overcome.

After a somewhat lengthy experience, I am convinced that not more than one person in ten wearing an artificial palate (and I use the term now indiscriminately for both classes of instruments), having passed the age of childhood before its introduction, will *of his own volition* attain such perfection of articulation and enunciation that he does not betray his defect; while I also know that there are innumerable instances of persons who have reached mature age before they began their work of correction, who, *under proper instruction* and with perseverance, have attained absolute perfection.

The imperative need of instruction was recognized by me in the earlier part of my practice, and from time to time I referred patients to teachers of elocution for help. The result was not always satisfactory. Most of such teachers placed more importance upon *elocution* than upon *articulation*, and although some of the pupils made wonderful progress in articulation, I was not altogether satisfied with the methods of instruction.

For the last ten years or more there has been associated with me in my practice a lady who possesses, besides other accomplishments of education, a vocal and elocutionary training. She conceived the idea of formulating a system of teaching articulation to cleft-palate people which might be denominated "a system of vocal gymnastics," based upon the methods used in teaching elocution and in teaching deaf mutes to articulate. Her system is not one of fixed and rigid rules. It is not one that could be taught in books, but it is one of general principles, varied in its application to the idiosyncrasies of each case.

As the result of having such an able coadjutor, of late years I have insisted that it would be almost useless for me to make an apparatus for any patient unless my work could be supplemented by proper instruction; and, furthermore, I have carried this denial to the extent of refusing to make an apparatus for any one whose apparent mental condition showed an incapacity for study and improvement.

The results under such tuition as indicated have sometimes been rapid and marvelous.

A lady, about twenty-five years of age, from a distant state, applied to me. She carried in her appearance evidence of intellect and good breeding, but there was a certain hopelessness in her countenance, bordering on despair. Her case was not unlike many others, and, fortunately for her, there was no hare-lip to disfigure a rather handsome face. Her speech was the speech of the average cleft-palate patient, but she was very averse to talking, and brought a companion to speak for her. The arrangements were made for me to do my work, and for her to go under tuition.

Before I had made much progress, her morbid condition impressed me so much that I spoke to her of it. I told her that to me it betrayed unmistakable evidence that she had no hope that she would receive benefit. She then told me that she had little or no faith in the result; that an effort had been made two or three times before, both by surgery and by mechanism, but all had failed; that she was of an exceedingly sensitive nature, and had avoided all society; that she had neglected her education because of her deformity; and that she had come to me as a final resort, with the determination that if this failed she would never return to her family, but would find some way to end all her troubles.

I told her that it was almost useless for me to go on, unless she made an effort to throw off that condition and assume one of expectation of relief; that I could promise her, with absolute certainty, great benefit, if my directions were faithfully carried out.

Suffice it to say that while at first she seemed incapable under tuition of comprehending what she was taught and directed to do, because her faculties had been dormant through neglected education; nevertheless she shortly began to rouse herself, and made progress.

I lost sight of her for three months, during a summer's vacation, and on my return was astounded at the change. She was speaking exceedingly well, her face was brilliant with joy and gratitude, and she fully realized that there was something in life for her; that life was worth living.

It has been generally supposed that a child with a congenital cleft must wait until the jaw and alveolar arch were pretty fully developed, or until about the twelfth year of age, before it was prudent to apply an artificial palate. I favored that idea myself many years ago, partly because I wished to avoid the annoyance to which the child might be submitted, and partly to save the expense of a second apparatus when the child should become older.

My first use of such an appliance for a child was in January, 1865. It was for a boy eight years of age, who was nervous and irritable, and the results discouraged me.

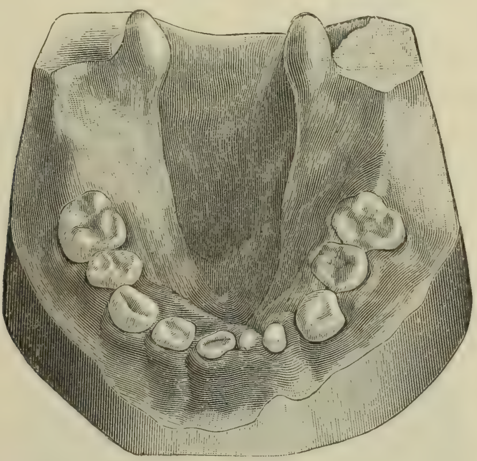
But the experience of many cases since has convinced me that my hesitation was a mistake. The advantages gained by an early interference far outweigh any financial consideration, and I find that children become accustomed to the presence of such a foreign body quite as readily as adults.

The benefit to be gained by preventing improper efforts at articulation from becoming fixed habits, as well as the greater ease with which habits already formed can be broken up, must be manifest to every one. Children adopt involuntarily the tone of voice, accent, and peculiarities of utterance of those with whom they are associated, and I am satisfied that perfect results are attained more rapidly and with less effort by supplying an artificial velum early in life.

A little girl seven years of age was brought to me. She had a hare-lip, which had been closed by a very fair operation, but leaving one nostril much more open than the other. I recommended a supplementary operation for reducing the size of that nostril, because I have found that an excessively open nostril, in such cases, makes articulation more difficult, besides altering the tone of the voice.

For this child I made an artificial velum, and she was put under training. This training was an hour's lesson three times a week, the practice to be kept up under the care of her governess. The tuition continued for three months, after which the child was, by the removal of the parents, taken beyond the reach of her teacher. Within a year she was speaking quite as clearly as the children of her age, and the nasal resonance peculiar to such cases had entirely disappeared. During the following year, before she was nine years of age, her parents were spending the summer at a noted fashionable resort, and the child was placed in a select private school. She had learned to keep the fact secret that she was wearing an artificial palate, and her speech in nowise betrayed her. After a time her school-teacher came to her mother, and inquired if the child had ever had any special attention given to her enunciation, because, said she, "she speaks so much more clearly and precisely than other children, that I thought she must have had some special training."

FIG. 8.



Another instance of a peculiarly interesting nature is that of a child six years of age. The model of this case is shown in Fig. 8.

I hesitated very much about undertaking this case, because of the difficulty of finding anything to which I could secure an artificial palate. The crowns of all the deciduous teeth in her mouth, except one, had decayed off level with the gums, and the first permanent molars had not erupted. But the mother of the child was persistent, and I made an artificial velum, clasping the fairly whole crown of a temporary molar on one side, and putting a gold crown on the remainder of its mate on the other side of the jaw, to which the second clasp was fitted. This child was for three months under the care of my teacher of articulation. She was formally given a short lesson twice a day, and informally kept up a more or less continuous practice. She had never learned to read, not even knowing the letters of the alphabet. At the end of three months she could read simple lessons with ease, and her articulation was as faultless as that of the best children of her age. Previous to the beginning of this child's training, her imperfect speech was recorded by a phonograph.*

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* At the time of this writing, one year after the introduction of the instrument, I have seen the child, and her speech is without defect.—N. W. K.

The next case, shown in Fig. 6, is one of especial interest. The fissure is very small,—one of the smallest that I have ever attempted to treat. It would probably have encouraged the average surgeon to undertake an operation if he overlooked the fact which I have frequently pointed out,—viz, *that even with the gap in the velum perfectly closed there would still be a gap between it and the pharyngeal wall, which could not be bridged across except by an appliance; and, furthermore, if the split in the velum were surgically closed, it would prevent the introduction of a suitable apparatus.*

In this case, notwithstanding the smallness of the fissure, the speech was about as bad as bad could be.

This was a lad about ten years old, and to publicly prove his malarticulation I took him before one of the medical societies in New York, and submitted him to the following test: I gave to each person in the audience a piece of paper, upon which were thirty-four blank spaces numbered from one to thirty-four consecutively. I held in my hand a printed slip, of which the following is a copy:

1. George Bixby.
2. Jack.
3. Mug.
4. Doctor.
5. Cat.
6. Sarah.
7. Twelve.
8. Yellow.
9. Fight.
10. Night.
11. Pitch.
12. Throne.
13. Valley.
14. Rudder.
15. Giddy.
16. Beggar.
17. Ditch.
18. Goose.
19. John.
20. Kate.
21. Nasty.
22. Two.
23. Rat.
24. Pig.
25. Mask.
26. Fancy.
27. Disk.
28. Best.
29. Crown.
30. Church.
31. This.
32. Stone.
33. Book.
34. Good-bye.

I asked the lad to pronounce loudly, and with as much distinctness as possible for him, the word against each number as I pointed to it. As he did so I requested the audience to write on the slips against the same number their interpretation of what they heard. The advantage of this test lay in the fact that the auditors had no clue to the coming words, and therefore were guided solely by their hearing. The lad was repeatedly asked to repeat the words, and in the end the slips written by the audience were compared with the printed slip held by me. Many of the records showed that not a single word had reached the writer correctly, and in no instance had more than five of the whole list been fully understood.

The instrument which I made for this lad is illustrated by Fig. 9, and its position when in the mouth is seen in Fig. 10. By an observation of Fig. 6 it will be seen that the apex of the cleft is only about half-way from the uvula to the junction of the hard and soft palates.

To accommodate considerable vertical movement in the unruptured portion of the natural velum, the instrument is hinged at the posterior border of the palatal bone, so that ample provision is made for the vertical movement of the artificial velum. The hinge is supplied with a stop to prevent the velum from dropping below the fissure, but it can be carried upward with ease.

I have not infrequently met men of my profession who have told me of their success with artificial palates, and even that their patients showed immediately a great change for the better; that whereas they could be understood only with much difficulty before the introduction of an appliance, they would immediately upon its introduction be speaking almost perfectly. I have listened to such statements, but I have never given their authors the credit of self-deception. I knew better. They were simply trying to gain a standing by imposing a naked falsehood upon me.

Seeing what wonderful results could be accomplished by education and practice with such a poor substitute for the natural organ as an artificial palate, I entertained the idea that in the case of a limited fissure without hare-lip, and with an apparent abundance of material to facilitate an operation, if such a subject could be taken in infancy, a successful surgical operation might be performed, and the child put upon a course of training for articulation, so that complete success would follow. I argued that a surgical septum thus made (before the full development of the adjacent tissues) could be developed by training into an activity which, as natural development went on, would increase the size and power of the organ, and probably overcome the physical as well as the physiological defect.

FIG. 9.

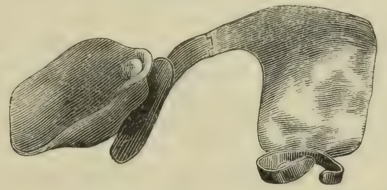
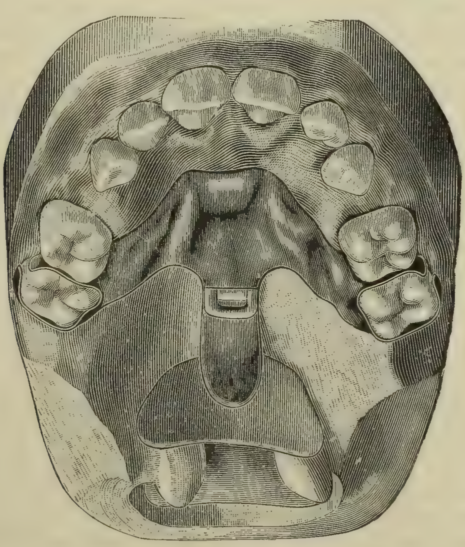


FIG. 10.



An excellent opportunity was presented in a child three years old without hare-lip, and with fissure and tissue favorable for operation. Upon my recommendation such an operation was performed, and it was a complete success in a union of the velum and apparently considerable of the uvula. A very small opening was left at the apex, and, as it seemed unnecessary at the time to put the child to the annoyance of a second operation, this small opening was covered with an obturator, and the child at four years of age was taken in charge by my teacher associate. A daily systematic practice was instituted, under her personal supervision, and the child's governess was instructed to supplement the practice daily. For the first few months the results seemed very promising, and hopes of complete success were entertained. Four years have since passed, and I have recently seen the child, now eight years of age. The condition is most mortifying. There has been no commensurate enlargement or broadening of the palate. There is abundant activity, and in that sense the training has been of value; but the space between the posterior border of the velum and the pharyngeal wall is now so great that it is hopeless to expect a stretching of the velum so that it will bridge the gap. The articulation is now probably as defective as if no operation had been performed, and the training has simply prevented bad habits of speech.

To me this was a personal mortification, because I had long entertained the idea that in this direction lay the possibility of the anticipation of all appliances, by an early operation and subsequent training. My only recourse now seems to be to cut open the palate, and put the child under the bondage of an apparatus all her days.

When I first heard incidentally that Dr. Brophy had solved this problem, I rejoiced, for although I have been enabled by the use of appliances to mitigate the afflictions of a large number of these unfortunate people, I have always regarded it as the opprobrium of surgery that nothing more has been accomplished in this direction.

I have not seen any of Dr. Brophy's operations, but I have read with care his very lucid descriptions, and I have a mental picture of the result before me.*

I hope that his sanguine expectations of perfect articulate speech in those cases will be realized; but if they are, it will violate all my observations of forty years. It may be that through the medium of his cases we shall make new discoveries in the mystery of articulate speech. It has been universally held that clearness and distinctness of enunciation are largely dependent (other things being equal) upon a broad and well-formed jaw, and that a narrowed, ill-formed jaw and irregular dental arch are hindrances to vocal culture. But it may be that we shall now learn that these theories are erroneous.

I fear that Dr. Brophy's laudable desire to achieve distinction as an oral surgeon has led him to overlook the importance of some of the inevitable results of his procedure.

As open nasal passages are essential to the purity of the voice and speech, it is pertinent to inquire, What becomes of these passages when the two halves of the superior maxilla are jammed together? With these passages permanently obstructed, is articulate speech likely to be perfected?

It will be several years yet before he can prove the truth of the following assertion : "When the child comes to an age that he may articulate, his articulation is correct, and he lives and moves and has his existence without being embarrassed through life with the deformity which characterizes cleft palate."

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* Dr. Brophy's operation is as follows: Vivify the edges of the fissure "thoroughly and with a bold hand. . . . On the hard palate trim the opposing surfaces of the bone as well; . . . the knife will easily cut through the soft bone of the hard palate and the alveolar process."

The fissure is brought together by wire sutures passing through a lead button and the body of the maxilla above the palatal bone, then tightened by twisting until the parts are in contact. In some cases the maxillæ are divided horizontally beneath the malar process.

I have seen many cases of mal-articulation after excellent operations on the soft palate, when the jaws and teeth were well formed, and I have also seen too many cases of indistinct utterance arising from ill-shapen jaws and irregular teeth where the palate was normal, to believe that the foregoing quotation from Dr. Brophy can ever come true in a case where hard and soft palate and jaw-bones are operated upon as described by him.

When asked what the effect would be upon the germs of the undeveloped teeth, he was wise to answer that he "did not know." But opinions will differ when he says "it makes very little difference even though the germs of several teeth are destroyed." Again he says, "If, however, the upper superior [*sic?*] arch should be abnormally contracted, and when the teeth erupt fail properly to antagonize with their fellows of the lower jaw, the means well known to the modern dentist may be employed, by which the arch can be expanded and the slight abnormality removed."

Is such an abnormality slight?

The one redeeming thought in Dr. Brophy's paper before the Congress lies in the following paragraph : "It must be remembered that a surgical operation, to be a success, must leave the patient with sufficient palatal tissue perfectly to close the posterior nares during articulation. An operation may be surgically successful, but if there is insufficient tissue to close the nares in the articulation of sound, it will not be a physiological success."

If Dr. Brophy will confine his operations to cases where there *is* "sufficient palatal tissue perfectly to close the posterior nares," he will confer a boon upon humanity, but he will not have many patients.

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PROCEEDINGS OF DENTAL SOCIETIES.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting, Tuesday evening, December 12, 1893, at the New York Academy of Medicine, No. 17 West Forty-third street ; the president, Dr. William Carr, in the chair.

INCIDENTS OF OFFICE PRACTICE.

Dr. S. G. Perry. Some time ago a lady came to me in great tribulation, having lost a lower lateral, which was on a small plate. It had dropped down a pipe, beyond the reach of the plumber. There was to be an entertainment that night, and she wanted the tooth replaced on short notice. I remembered that about a year ago a patient had lost a lower lateral, and I had drilled holes through the tooth and tied it fast to the adjoining teeth, until the gum should heal so that a suitable plate could be made, it not seeming to be a proper case for implantation. It was tied there for the purpose of leaving it in for a week or so, but it is there to-day, and she prefers to leave it there. She ties it herself occasionally. In this case I took a natural tooth which I found among my supply of teeth for implantation, drilled a couple of holes through it, and tied it fast, as you will see by this model. The end of the tooth, as you see, is scalloped to fit on the gum. You will observe that the natural teeth tip toward each other so that an impression taken in the usual way would draw in removing. In this case the impression was taken with red impression material on one side to half the thickness of the tooth, and then on the other side, taking it apart, so that the impression did not draw at all, giving a distinct outline of the tooth. This way of taking an impression I considered of very little account. It originated with me a great many years ago, and I took the impression without thinking it was of any value at all. I would not show it to-night, but Mr. Hackett, who has done artificial work for me for some time, told me that he had been working for dentists in New York for forty-seven years, and he had never seen an impression taken in that way before. If there is any one here who has not taken an impression in that way, it will be worth while to try it, for it will give an impression which is absolutely correct. The impression material is chilled and removed, and trimmed as for an articulation, and then just held in place firmly, and wet, as a matter of course, so the fresh material does not stick to it. Then the other warmed impression material is put in on the other side, and cold air from the compressed-air apparatus is thrown upon it until it is chilled. The sections come apart, and you get a perfect impression in that way. Another advantage is that several casts can be taken from the impression without injury to it.

Dr. I. F. Wardwell. I saw a gentleman to-day who had a central which had come out over twenty years ago, and he had tied it with silk every two or three days, and kept the tooth in in that way.

Dr. Carr. What effect has it on the adjacent teeth?

Dr. Wardwell. None, that I can see.

Dr. Perry. In the case I speak of, which had been worn so long by this lady, the teeth were pinched together somewhat, and brought closely against the tooth which was tied, and really steadied it, so there was an advantage in it, instead of a disadvantage. I do not think I can induce that lady to have a plate, for she thinks this way is perfect.

Dr. M. L. Rhein then read a paper entitled "Ideal Bridge-Work."* It was accompanied by a number of illustrations.

Discussion.

Dr. George W. Warren, Philadelphia, Pa. Bridge-work is, without doubt, one of the most important and exacting branches of our profession, and should be practiced only by those possessing the requisite attainments, who are governed by sound judgment and correct ethical principles. While some diversity of opinion exists as to the advisability of permanently fixing such appliances in the mouth, I contend that, in all cases where the conditions justify it, a fixed or stationary bridge denture should be inserted. Where this cannot be done, a plate of gold or some other material should be inserted.

Dr. W. H. Taggart, of Chicago, Ill., sent models of a practical case of removable bridge-work, which he described as follows:

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* Printed in full at page 97 of the current number.

Model No. 1 represents the mouth as it came to me, showing a loss of the teeth anterior to the bicuspids. The remaining teeth were about in the condition represented. You will notice it is a mouth which needs considerable restoration of contour. I succeeded in doing this in the following manner: After the pulps were destroyed and the roots filled (which I think is quite necessary on account of the amount of cutting required to make the crowns absolutely parallel), I put on flat-topped crowns. The bicuspid has the offset in it to allow the telescoping crown which goes over it to have a porcelain face, as this bicuspid, you will notice, stands well forward, and would not be artistic if covered by a gold crown. I preferred fixing *this* bicuspid *this* way to cutting it off and putting a band with a tube in the root and a pin in the porcelain face, as I think it decidedly stronger. After these flat-topped crowns were made, and before they were set to place, I made a mark at the gum-line on each one, so as to know just how far the telescoping crown could go without impinging on the gum. Over these flat-topped crowns (out of the mouth) I made other flat-topped crowns to telescope, so as to come in contact in all their parts, and thus prevent any movement between the two crowns. Cusps were then struck up and articulated in the mouth, and the contour of the telescoping crowns made with solder, and the porcelain face put on the bicuspid. An impression was then taken, and a gold plate of two thicknesses of 30 gauge (soldered together to give stiffness) was struck up and soldered to the telescoping crowns. I then placed the flat crowns for the roots in their telescopes, and cemented them to the roots as though it were a permanent bridge, and allowed it to remain until the next day, when the removable part was removed, and then came the satisfaction of having attended *minutely* to *every* detail, as the bridge went on and off rather tightly but easily, showing that all parts were parallel.

In the restoration of the features I wished to get the effect of continuous-gum work, and still allow for making repairs on the porcelain in case of accident, without the danger of altering the accurate fit of the gold work. An impression was taken of the removable part, and a platinum plate was struck up, an exact duplicate of the gold plate. Over the cuspids and at the heels of this platinum plate extra pieces of big platinum-wire were soldered to give thickness enough of metal to allow screws to be put in.

Continuous-gum teeth were then arranged and baked on the platinum, and holes drilled and tapped and the screws put in, and the parts were ready to assemble At first, I put two parts together with melted sulfur, and screwed together while hot. The wisdom of having made it possible to easily take the porcelain teeth from the bridge proper was soon shown. While the patient had every privilege of offering suggestions during the arrangement and selection of the teeth, and finally expressed satisfaction, yet when they were finished and had been worn a few days, she decided that they were a little too light and a shade too dark and a little too short and a trifle too long, and that when she was sixteen years old she had such and such teeth; and as I had agreed to satisfy her, I had no trouble in removing and rebaking new teeth on the platinum base. She also spoke of a taste of sulfur in her mouth, and for that reason I united the parts with oxyphosphate cement and screwed together as before.

I am certain the teeth to which this bridge is attached will stand, as there seems to be no undue strain on them and each one helps to support the others, and after about eight months' wear it seems very rigid and comfortable.

Dr. W. G. A. Bonwill, Philadelphia. Some months ago I read an article before our Odontological Society on "A New Method of Clasped Plates versus Movable or Unmovable Bridge-Work," which my friend Rhein informed me was the basis of his ideal work. The article will speak for itself. I must say that I can show how unnecessary all of the so-called ideal is compared with what I conceive to be what we want,—namely, a realistic thing that any one can make, which we must admit would meet the greatest number of cases, and which any dentist could learn to do with ease, making the result a great and lasting satisfaction to the patient.

Dr. Rhein can make such cases as he has shown you, and can do it all without any mutilation or straightening a line out of perpendicular; but he envelops sound teeth with gold caps, and therefore I believe it is all useless and unnecessary work to make this ideal work. You run so much more risk of future trouble, and so much extra work if a break down occurs. Try the two systems,—the idealistic, and the original clasp method from which the former originated. Try once, and you will find that it will add a new arm to your practice and make your patients far happier.

Dr. R. Ottolengui. Without beginning by praising the essayist, I will come immediately to the paper. It contains a very great pleasure, and in one respect a slight disappointment. I will speak of the pleasurable part first. I think the doctor has made a mistake, where he enumerates the advantages of this method, in not giving more prominence to the fact that he does not mutilate the teeth. This should be placed first, in very large letters, because in the history of bridge-work this paper to-night will mark an era; and it will mark it mainly because it records a means of avoiding the malpractice of mutilating teeth. The doctor has been entirely too modest in treating that side of his question. That these gentlemen have invented a method by which any tooth, of any shape, may be crowned accurately without cutting away any of the tooth at all, seems to me to be of more importance than the devising of a removable fixture which is built thereupon, for even where a single crown is necessary, not as an abutment, but simply to cover a tooth which it were deemed advisable to cover, this method can be used. There is a point in connection with that, which is brought out very much by the fact that a gentleman who was to take part in the discussion to-night, and who is absent, sends us as the best and the latest thing he has done, exactly the old method of making the telescoping crown, putting on crowns which have parallel sides. It follows that the crown cannot have parallel sides unless the tooth under it has first been trimmed to have parallel sides, or unless at the gum-margin it stands off from a narrow neck. Only this month one of the western journals describes what the writer claims to be his original method, and he has exactly this same scheme of telescoping crowns. He begins with the statement that all the teeth which are to be used as abutments must be trimmed to a cone. In other words, he advises at the beginning of his paper exactly that which has kept some of our best men from adopting bridge-work. Some have been too conscientious to cut away teeth simply to put money in their pockets. There is no doubt in my mind that this has deterred a great many of the more skilled dentists from doing any bridge-work at all. I want to allude to a point which was also brought to my mind, partly because it is mentioned in the paper and partly because I have seen it condemned in a journal. The doctor said, after his crown is put on, and before the cement is allowed to harden, all of the edges of the crown are burnished to the tooth. The critic in one of the journals says that the man who burnishes the ends of his crowns admits himself to be an ignoramus, because he should know that the more he burnishes a band the larger he makes the circle of his crown. Now the man that wrote that puts on record the fact that he himself is an ignoramus, because it is simply an evidence of the fact that he is purely mechanical in his ideas, and yet not too mechanical. When he thinks of a band, he thinks of nothing but a perfectly straight piece of metal, which is wrapped around the tooth, and makes a band the same as a finger-ring. The more you burnish such a band on one side, the more it will bulge out on another. That is not the kind of band to make for a tooth. The normal gum-margin of any molar is practically the same, although most teeth vary in shape or size. As the doctor has said, the band must be made by first fashioning it with anything that you use as a pattern. That pattern will not have parallel sides, but curved lines. The parts which must be burnished to the tooth can be burnished without altering other parts of the band, because they depend below the line which is the true circumferential line. I do not know whether I can illustrate that perfectly.

This band here has a distinct dip in it at this point [illustrating on a chart], which matches this part of the tooth which it is to cover. If there were a straight line drawn across it would represent a line at which this band could be bent, without interfering with any part of the band which is above it. I remember once making a band for a tooth where the bifurcation of the roots showed. My band was made to extend down, and was burnished into the bifurcation. It did not interfere. It tightened the band.

Now I want to come to the part which I have said was a disappointment. It is not exactly a disappointment in the sense that I am disappointed with this method as a perfect method, for I think it a very admirable one. I had hoped, before I knew exactly how these bridges were designed, that we would have a method introduced to us which the majority of us could adopt, but unfortunately that is not true. This is an admirable method in the hands of a skillful man, but it will require men of exactly the skill of the gentlemen who have devised the method to follow it up. I am afraid that whilst this is, as the title calls it, the "ideal" bridge-work, it will remain a luxury, only to be had by those who can afford to pay high prices and go to high-priced men. It will not drive the charlatan out of the market, because at a moderate price the general public could not get good work. But if these gentlemen can get as far as this, they can go a little farther. While at present this is the summit of attainment in bridge-work, during the next ten years they may be able to point back to it as the beginning of the methods which will be in use at that time,—as the point of departure from which the same principles will be employed, but upon which will be built some less complicated method of making bridge-work.

It seems to me that there are so many present who know more about bridge-work than I do that I need say no more, except that at the end of my remarks I may commend the gentlemen for their valuable paper.

Dr. C. M. Richmond. As you all know, I have been working for a number of years in the direction in which our friend, the essayist, has been working of late. I see in this method a great many points which are commendable,—first of all, removable bridge-work. The man who still persists in putting in the mouth extravagant cases of bridge-work is getting his patients into trouble.

In making bridge-work, I may say that I have in my practice abandoned complications which appear to me to be fatal to this operation as a practical operation. I have reduced the practice to the simplest possible method, demonstrating to men who have visited my office ideas of bridge-work which to them have been a revelation. I discovered accidentally, in a case which I illustrated in the *International Dental Journal*, that I could make a band and drive it to what we term the largest or bulging portion of the tooth, and not beyond it, where it would make an imperfect condition of things by driving the band over a surface where it could not fit, with the margin of the band under the gum, where we could not get at it. Those bands have been cemented on for eight years, over two teeth supporting a superior portable bridge. That case convinced me that it was unnecessary to carry the band to the neck of the tooth. That relieved me of the necessity of cutting down the tooth, as was done in the case illustrated by Dr. Taggart, of Chicago. A crown can be fitted over a tooth, leaving the gum-line entirely free, so that the brush will keep it clean without the slightest difficulty. In regard to fitting the abutments, this piece of mechanism is very commendable. With all due respect to the essayist and to our friend Dr. Andrews, it is a very difficult matter to illustrate the mechanical construction of an operation of this kind, either by diagrams or by reading a paper, but I see in these illustrations a great many points which I can grasp when I look at the models. They are novel to me, and I shall put them into practice without a doubt. In fastening portable bridges, I make gold crowns which are cemented on as abutments, and then I make bands which are made of clasp metal, always using whatever methods are best at the time and for the case, for keeping the band from slipping farther than the required point. I find by making those bands of clasp metal that they never bend nor stretch, because they fit perfectly tight.

I have worn in my own mouth, for eight years, an upper case of bridge-work with three attachment points only. That case has been removed every day, cleansed, and replaced, and it goes on exactly as tight to-day as it did when I commenced to wear it. Those band-attachments are made of clasp metal, and the only point of attachment, the end of the root, is covered with a gold crown, and in that gold crown is a tapering, square tube, which fits accurately when it is home. It is quite loose until it arrives at the point where it was made to fit; the moment it reaches that point it is absolutely firm. I have a model of that case here, which I wish to show to Dr.

Andrews and the essayist, and also the other gentlemen present. It starts very hard, but when it is started from its position it very readily comes off. Two roots and two bands of that description will hold an entire upper set absolutely rigid. The patient can take it off every day and cleanse it without the danger of its getting loose. The idea of having these cases fasten to the teeth, one at a time, seems to me practically perfect. The dentist can fasten one tooth with cement, and get it secure every time ; but when he has to fasten on five or six crowns, that is a different thing. I have never seen an entire case where every one of the bands was perfectly cemented. I have found one, two, three, or four perfect ones, but one or two crowns were always imperfectly cemented. Therefore, portable bridge-work can be fastened to one tooth and perfectly cemented, but when attached to four or five teeth it cannot be done. I was delighted with the doctor's paper. I commend it highly and appreciate his ability, and I am glad that some one has had the courage to take hold of this and give us the bridge-work complete.

Dr. E. Parmly Brown. I have enjoyed the excellent paper and the very fine work shown. I know that that system will do just what is claimed for it in a large number of cases, with the exception of Dr. Richmond's criticism. That criticism is a broad one. With short bites, will that impingement be sufficient to retain bridges? In a large number of cases, unless it is done by a skillful artist like Dr. Andrews, it might be defective. What have we here that is good? Resting solidly on the gum ! Fifty years from now all dentists will make bridge-work. Some may then make bridge-work with so-called self-cleansing spaces, not resting solidly on the gum, but they will not let you know or hear of it if they can help it. Resting solidly on the gum is the correct principle, true to nature in every respect, in touch, in appearance, and in form. This is my conclusion after many years of experimenting. Dr. Atkinson held the same views before he died. Dr. Hamlet is here to-night, and the case in his mouth will settle the question as far as healthfulness goes. Dr. Hamlet's cases were illustrated in Dr. Evans's book five years ago. Yesterday he came to me, and he said he wanted me to fix a bridge for him that the natural pier tooth had failed in. Dr. Hamlet, when the bridge was removed, in what condition did you find the gum?

Dr. Hamlet. I found the gum in a healthy condition, and I also found that the surface of the bridge, next to the gum, which Dr. Brown makes of platino-iridium, was perfectly clean and polished, not a particle of food being under it in two years.

Dr. Brown. Dr. Hamlet has a bridge which I have shown at several clinics. This first upper right bicuspid was anchored nearly eight years ago to a gold filling in the second bicuspid only, and remains unbroken. The gum is perfectly healthy. He has a jaw which gives a big strain when he eats. Dr. Hamlet showed a case some six years ago at the First District Society which he tells me he saw recently. He tells me that bridge, without mutilation of the teeth, is in there to-day. Speaking of mutilation, there are different kinds of mutilation. This case which Dr. Evans illustrated five years ago in his book has been in the mouth five and a half years,—five porcelain bridges, all anchored into living teeth, with gold fillings. Two months ago I took this gentleman down to Dr. Evans. He saw him when he illustrated his book. The patient has gained thirty-three pounds, every bridge is there, no filling has loosened, no atom of porcelain has broken. The mouth was clean and sweet; only one pulp has died in his mouth, and I fixed it in half an hour. Pulps are dying all the time. They die when you fill teeth. That tooth is not as good as when the pulp was alive. Why did he have this work done? He would not have consented to have this system shown to-night by the essayist put in his mouth. He shows the cuspids too plainly which would be crowned with gold. That is one form of mutilation.

Here is a mouth that is public property. I made these bridges at a clinic. The lost bridges disappeared in Chicago. There were four bridges in a lady's mouth, all anchored into living teeth,—two laterals and three bicuspids on each side, capped back on the living molars with gold crowns. These are all attached to gold fillings. I have seen this lady within three months. I will bring her to the next clinic you have. Not one filling is out, not one of those bridges is loose, not one case has broken. You can move them, and feel them move, according to the movement of the natural teeth in their sockets, of course. This porcelain is weak, and it is a very unfavorable case. The gums are perfectly healthy, as you saw them four years ago when shown at clinic. I want to say a word about fillings anchored to bridges. The essayist said fillings could not anchor bridges unless below the average strength of mastication. Fillings are anchoring bridges in even the hardest masticating mouth. These cases illustrate that perfectly.

In anchoring these bridges in gold fillings, you must make the gold very solid. I have with me an instrument which I devised a few years ago, and which I have now perfected. It is a tooth-bracer, made of a pound of tin. It is placed against the tooth, and the shock of the mallet is obviated. I can place it behind any tooth, and when I have it firmly in position, and am using a delicate instrument on the other side of the tooth, I can guide the instrument more truly. This form is more suitable than any other. You can suspend it from the ceiling with a counter-weight, so it will not drop; or your assistant can hold it, or the patient, or the dentist can hold it himself. It is an important factor in relation to this bridge-work which we are discussing, although it should be used for all operating where a blow is used on the teeth.

What do you mean by bridge-work? I would not think of telling any one how I would attach a bridge until I saw the case. In bridge-work there are nine cases out of ten that are not done well, because you have not the system. There was the case illustrated, of the gentleman who had traveled all over the country to get bridges to suit him, and who was finally recommended to me. Dr. B. Holly Smith, who is connected with the college in Baltimore, said to him, "If you let Brown put those teeth in with fillings, they will all be out in a year." He met Dr. Smith in Baltimore some time after, and told him of the work I had done. The gentleman said he was satisfied to have his mouth bridged with porcelain only anchored in fillings, and five years have proved his judgment good.

Do not criticise things unless you have studied them. Some bridges should be put in with fillings, both gold and amalgam, some on capped roots, and some onto gold crowns. Nine out of ten of the bridges that I am putting in are single teeth in the anterior part of the mouth. I advocate permanently attached bridges in nine out of ten of the bridge cases that come to my practice. In the tenth case, a removable bridge might be better, for certain reasons which are obvious to you all. The ideal bridge cannot be any one thing in particular. It must be ideal for the case. That bridge in Dr. Hamlet's mouth is ideal for his case. In other cases, you might require a gold crown in the back part of the mouth to have it ideal. Some cases might call for a removable bridge to be ideal. To further illustrate the question of fillings holding bridges, here is a box of cases that I prepared and sent to the Illinois Society. Here are two temporary bridges of four upper incisors, made the old way, without the platino-iridium plate. These bridges were worn three years. I have permanent bridges in now,—one was for a Harvard student, and the other for a church singer. That bridge is in now, anchored into living cuspids. The young man is down in Wall street. He has worn them for six years, and the pulps are living in the cuspids where anchored. Here is an ancient bridge that I took out of a minister's mouth. That left upper lateral was anchored into a cuspid and a central with gold fillings. I asked him in the presence of Dr. John Miller, who was having a tooth filled at the time when this was put in, how long he had had it made? He said, "I was preaching for seven years in Salt Lake City. It was put in about eighteen years ago there." He said Dr. Calder did it.

Dr. Frederick A. Peeso, Philadelphia. The system that Dr. Rhein has described is something almost entirely new to me, although I have seen things somewhat on the same line. The thing that struck me most was the capping of the teeth without mutilation. I have been given to mutilating the teeth more, perhaps, than I should have done. In some cases the swell of the tooth has been almost entirely removed. I shall in the future give more attention to the preservation of the normal shape of the teeth than I have done. I was very much interested in Dr. Brown's remarks on attaching teeth in with fillings. I have seen a great many cases, but very seldom have they been in any length of time without working loose. It seemed to me that the strain would be so great, unless the force of mastication were greatly below the medium, that it would eventually get loose. Where I have used a metal cap for the anchorage of a bridge at one end, instead of cementing the bridge in at the other end, supported by a cuspid, for instance, I have cut the tooth and put in a very hard gold filling, making just a little depression in it. Drill a little cavity in the cuspid, and pack the gold very hard in it, and countersink it. Point it, and let it rest right in there. There is no chance of its decaying the tooth. It has worked very nicely in every case that I tried. In removable bridge-work, I have made one quite large case by the method that Dr. Richmond described.

I think this evening's essay and the cases shown will prove of great benefit to me, and I shall try to make it so.

Dr. E. S. Gaylord, New Haven, Conn. I have had considerable experience during the past twelve years in bridge-work, yet in the revelation of to-night I am about ready to confess I have never made a bridge worthy the name. In the preparatory treatment of the teeth by which a bridge is supported, I would not hesitate so much at mutilation, or liberal cutting, as in all such cases I perfectly protect the surface by permanently cemented cap crowns, but in no instance would I favor fixed bridges. There is but one metal I recognize as pre-eminent in all forms of bridge-work,—that is, platinum, or iridio-platinum. To unite the parts, use a high grade solder. Its non-oxidizing property under all conditions favors its exclusive use, and in no instance have I observed any hypertrophied condition of the tissues, as is frequently the case when gold is used.

A member. Did you use pure gold?

Dr. Gaylord. I regard pure gold as too soft; besides, it is not so completely in harmony with gum-tissue as platinum. A desirable form of gold I find in American coin of date prior to 1840.

At Chicago, last summer, I had the pleasure of seeing—in the mouth—a bridge made by Dr. Rhein, as described in his essay to-night. It seemed perfect in every respect, but I apprehend its use will be somewhat limited on account of seeming complications.

The paper I heartily indorse as a whole, and predict as it goes to the world its influence will prove a stimulus to produce better work, and the use of none other than removable bridges.

Dr. I. F. Wardwell. I wish to thank Dr. Rhein for bringing my name in connection with this idea of inserting teeth. My practice has been given mainly to holding single teeth in position. The idea was rather a necessity, and as "necessity is the mother of invention," I devised this. The first case that came to me was that of a young lady who had endeavored to wear a plate, which was not satisfactory. I was asked to devise something for holding the teeth in the spaces. The case was one where no laterals had ever erupted, and the spaces were very narrow. I had known of Dr. Webb's and Dr. Bing's method of inserting such pieces, and I knew if I endeavored to do these in that way (leaving little spaces where the gold bar joins one tooth to the other) it would not present a good appearance, so I began to think what I could do. I took impressions, and *thought* over it a little. I have always claimed that the manner of this device was the result of a dream, for that night I saw exactly what I would do the next day. I awoke knowing just how to go about it. I wedged the spaces, and so obtained sufficient room to put in a full-size crown; then straight-pin crowns were selected, and this little dovetailed piece of gold was soldered to the crown; then I fixed a little bar, running from one tooth to the other, to which an anchorage for the crown was soldered. I might call it a dovetailed staple. They were made to accurately fit, mostly by model, and then this little bar was fitted into the cavities made in the adjoining teeth. The crown was then put in place into the dovetailed staple, and in this way the correct position for the bar was determined and held with oxyphosphate. After it had hardened sufficiently, the crown was removed, and the gold fillings put at each extremity of the bar. At first I made a mistake by not making it three-cornered, as I do now. In that way it prevents any tipping or moving. This manner enables the gold fillings to be very nicely finished off, and after that has been done, the crown is simply slipped in position, pressing hard against the gum, and is prevented from being removed by a small gold filling at the end of this gold staple. Dr. Rhein saw some of the cases that were done, and I am glad the idea has reached this *removable* bridge. I have never put in more than single crowns, and with *removable* bridges I have had no experience whatever. I look with much approval upon this method, and if it were necessary for me to have anything of the kind done, I should like to have it done in this way.

Dr. S. L. Goldsmith. Some of the gentlemen who have preceded me have spoken of the advantages of making the removable parts of the bridges of rubber. As I have seen these cases, and have had something to do with them, I would say that in the cases which are here illustrated the teeth are held with rubber. The manner of making is as follows: After the teeth have been ground and fitted, they are held to the opposing side of the articulator with a little hard wax. A mixture of marble-dust and plaster is then poured around them, which, after setting, is contoured to the shape which you see here. Then dies are made for each side, and pieces of gold or platinum swaged to completely cover the wax. These, after being soldered to the framework, form a box which is filled with rubber, into which the teeth are pressed and then vulcanized. It is necessary at this stage to cut a hole on the lingual side of the boxing to allow for the expansion of the rubber in vulcanizing, or else it may bulge the gold in places least desired. In order to make room for the rubber when expanded, a small cone-shaped piece of wax is fastened to the boxing over the aperture previously cut. The heat in vulcanizing causes this to be absorbed into the plaster, and in consequence leaves a space the size of the piece of wax used.

Dr. Rhein. The hour being so late, my closing remarks will of necessity be brief. First of all, permit me to thank the audience for their kind indulgence and for their commendation of my efforts. There has been so much praise bestowed upon the paper that I have very little to controvert. A number of the gentlemen have spoken about the system I have presented, and to this I must enter a protest. Not a line in the paper speaks of any system. We hear altogether too much of the different systems practiced by different men to accomplish certain results. It is to be hoped that the profession is gradually reaching that plane of broad-mindedness when each practitioner will in the daily routine of practice cull the daintiest petals and sweetest flowers from the mental greenhouses of his colleagues without regard to *systems*. My sincerest wish is that the paper presented this evening will be looked upon as a stepping-stone toward a higher plane of practice, and let no man adopt it as a system.

Without prejudice to Dr. Brown's renown as an operator, in which respect he finds me an earnest admirer, I wish to say that while a freshly inserted porcelain bridge has a fascination for many when they first insert it into the mouth of a patient, the feeling of despair that overcomes that operator when the patient returns with a clean fracture of an important part of the denture can only be appreciated by those who have been there. The method of Dr. Wardwell alluded to in my paper is far in advance of anything that Dr. Brown has ever demonstrated to us in this line, although it antedates any of Dr. Brown's work. By using this method, Dr. Brown could have obtained a contour in the case of the bicuspid in the dentist's mouth presented here this evening. The case which he exhibits to us, and which I have examined, is much inferior to some of his work. There is no attempt at contouring, and it would be extremely difficult to find any ordinary patient that could keep such a tooth clean.

Nothing in my remarks will be found to disagree with Dr. Gaylord's preference for platinum. The bridge can be constructed in any manner, even of all porcelain, but very few patients will consent to a platinum crown where it is liable to be exposed to view. I wish, however, to say a word in reference to Dr. Gaylord's fear that the work is of too difficult a character for the average dentist to do. While I confess that my time being exclusively occupied at the operating chair, I do none of the laboratory portion of the work myself, still by carefully explaining the details to a *capable* laboratory man, being careful to teach him the technique, I have found no difficulty in having the work done. In our laboratory we have a young Russian, who has been in this country only a year, who understands our language very poorly, and who has mastered the technique of the work thoroughly. The paper has been prepared with a care to the intricate detail of the work, and it has been so carefully illustrated that there is no man capable of doing a good piece of crown-work but is able, from the careful study of the article, with its illustrations, to thoroughly master the work shown. It is not intended for men who turn out work in a sort of wholesale manner, for the secret of its success lies in the dentist giving the necessary *time* and *patience* to its manufacture, for the work is only meritorious when each portion is done with that accuracy that the paper calls for. This necessarily does make it an expensive piece of work, and this recalls to my mind the reply once made by a well-known dentist to a patient's objection to the fee asked for a certain operation: "The wealthy alone enjoy the blessings of good dentistry." Of necessity this is too true.

If expense is a paramount objection to inserting artificial teeth in any manner similar to this, and it is necessary to avoid the use of a plate, nothing up to the present time has been shown that equals in merit the cases described and illustrated by Dr. Bonwill.

My closing remark is in reference to the only criticism that seemed to have been made on the work. This was to the effect that a crown going half-way over a tooth used as an abutment was sufficient, and that there was no necessity of the crown extending down to and below the gingival border. This idea of half crowns down to the swell of a tooth is not new to Dr. Andrews nor to myself. We have many of these half crowns in position to-day, and they are serviceable in cases where the teeth used are good, strong molars in healthy mouths, where the teeth do not tilt, where the roots are not exposed, and where the bridges they have to carry are not too much of a strain for such an abutment.

The patients who come to us for bridges are very seldom people whose mouths are in a healthy state, but incline more to the opposite extreme; and as much as there is found any tilting of the teeth used as abutments, so much more uncleanly half crowns will be found when used. And in proportion to the amount of root-substance exposed, so much less able are such teeth to withstand the strain of bridges when half crowns are used.

Dr. Brown. I want to say now that I have not seen one single diseased mouth in fifteen hundred porcelain bridges resting on the gum, except where temporary bridges were put in, anticipating recession, as in the case I mentioned of the singer, who had to have a temporary bridge the same as she would have had to have a temporary plate. I do not say that no case has ever had disease under it. I should have said that all work is subject to fracture or damage to a certain extent. This case of Dr. Hamlet, which the essayist says is not perfect, I say is perfect for the time it was done. It is clean and sweet in his mouth, and was done eight years ago, and not as we make them now. To-day we can take that out of his mouth and reproduce it so that you cannot tell it from a natural tooth, and we are doing it every day. This tooth is a little loose, but that looseness is a safety-valve.

Dr. Ottolengui. I am glad to hear that Dr. Brown's cases get loose, because I thought mine were the only ones.

B. C. Nash, *Secretary.*

WOMAN'S DENTAL ASSOCIATION OF THE UNITED STATES.

The regular monthly meeting of the Woman's Dental Association of the United States was held January 13, 1894, at 1308 Walnut street, Philadelphia; Dr. Elizabeth A. Davis, chairman of executive committee, in the chair.

Dr. Martha C. Corkhill read a paper, subject: "Advisability of Explaining Existing Conditions to Patients."

The next meeting will be held at 1308 Walnut street, Philadelphia, February 3, 1894.

Eliza Yerkes, *Recording Secretary,*
4004 Chestnut street, Philadelphia.

ODONTOLOGICAL SOCIETY OF CHICAGO.

At the regular meeting of the Odontological Society of Chicago, held at the Chicago Athletic Club on Tuesday evening, December 19, 1893, the following officers were elected for the ensuing year: W. V. B. Ames, president; C. N. Johnson, vice-president; Louis Ottofy, secretary-treasurer; P. J. Kester, A. W. Harlan, J. W. Wassall, Board of Censors; C. S. Case, curator.

Louis Ottofy, *Secretary.*

ST. LOUIS DENTAL SOCIETY.

The following officers for the year were elected January 2, 1894: Dr. J. B. Newby, president; Dr. J. B. Vernon, vice-president; Dr. F. F. Fletcher, recording secretary; Dr. John G. Harper, corresponding secretary; Dr. A. J. Prosser, treasurer; Dr. William N. Morrison, Dr. P. H. Helmuth, Dr. O. H. Manhard, committee on ethics; Dr. L. A. Young, Dr. P. H. Eislœffel, Dr. C. L. Pepperling, committee on publication.

John G. Harper, *Corresponding Secretary,*
800 Pine street, St. Louis, Mo.

DENTAL SOCIETY ANNOUNCEMENTS.

NEW JERSEY STATE DENTAL SOCIETY.

COMMITTEES FOR 1894.

Accommodations—Dr. Charles A. Meeker, Dr. C. W. F. Holbrook.

Programs—Dr. Charles A. Meeker.

Clinics—Dr. R. M. Sanger, chairman ; Dr. O. Adelberg, Dr. A. R. Eaton.

Exhibits—Dr. C. W. F. Holbrook, chairman ; Dr. Harvey Iredell, Dr. B. F. Luckey.

Essays—Dr. S. C. G. Watkins, chairman ; Dr. C. S. Stockton, Dr. J. Allen Osmun.

Clinical Conference—Dr. Harvey Iredell, chairman ; Dr. William E. Truex, Dr. J. W. Curtiss, Dr. Thomas Moore, Dr. I. M. Vandewater.

Dental Literature—Dr. A. R. Eaton, chairman ; Dr. George E. Adams, Dr. W. Woolsey.

Mechanical Appliances—Dr. William P. Richards, chairman ; Dr. Henry A. Hull, Dr. J. W. Kitchell.

Materia Medica—Dr. Charles A. Meeker, chairman ; Dr. G. Carleton Brown, Dr. G. E. Adams.

Prosthetic Dentistry—Dr. F. C. Barlow, chairman ; Dr. H. B. Van Dorn, Dr. P. J. Wilson, Dr. J. W. Crater.

Transportation—Dr. George C. Brown.

Press—Dr. F. C. Barlow.

Inspection in the Public Schools, etc.—Dr. William L. Fish, chairman ; Dr. W. E. Linstead, Dr. F. L. Hindle, Dr. A. A. Schubert.

Legislative Committee—Dr. Charles A. Meeker, Dr. F. C. Barlow, Dr. James C. Clarke, Dr. George C. Brown, Dr. R. H. Sheppard, Dr. A. R. Eaton (chairman to be elected).

Entertainment Committee—Dr. B. F. Luckey, chairman ; Dr. William L. Fish, Dr. F. E. Riley, Dr. O. Adelberg, Dr. William E. Truex, Dr. G. E. Adams, Dr. William E. Linstead.

The chairmen of the respective committees will at once communicate with the several members of their committees, and arrange for the work to be performed. The secretary will make a call for results May 26. Meetings of the several committees can be called for the afternoon of February 19 and April 16, from 2 to 6 P.M. The use of rooms on the third floor of S. & J. Davis, No. 943 Broad street, Newark, has been tendered the committees.

CHARLES A. MEEKER, D.D.S., *Secretary*,
29 Fulton street, Newark, N. J.

ILLINOIS STATE DENTAL SOCIETY.

THE thirteenth annual meeting of the Illinois State Dental Society will be held in the Senate Chamber, Springfield, Ill., May 8, 9, 10, and 11, 1894. An interesting program is in the course of preparation. Practitioners of Illinois and of adjoining states are cordially invited to attend.

LOUIS OTTOFY, *Secretary*,
1220 Masonic Temple, Chicago, Ill.

VERMONT BOARD OF DENTAL EXAMINERS.

THE next annual meeting of the Vermont Board of Dental Examiners will be held at the St. George Hotel, White River Junction, Vt., Wednesday, March 21, 1894, at two o'clock P.M.

R. M. CHASE, *Secretary*,
Bethel, Vt.

ST. LOUIS DENTAL SOCIETY.

THE St. Louis Dental Society will hold its annual clinic on March 20, 21, and 22, 1894. Reduced railroad rates. A cordial invitation is extended to all members of the profession.

For further particulars address

JOHN G. HARPER, *Cor. Secretary*,
803 Pine street, St. Louis, Mo.

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EDITORIAL.

THE GOUTY ORIGIN OF PYORRHEA ALVEOLARIS.

THE history of all discoveries, if accurately told, would probably show that no one of importance has sprung into existence as the full-fledged product of any single mind. They have usually been the outcome of long periods of observation by many minds, the final result being impossible until the data which had been gathered were sufficient in number and extent to furnish a basis for some one to make the generalization which has constituted the discovery.

History furnishes an unlimited number of examples of the evolutional growth of discoveries from small beginnings. In dental pathology no better or more familiar instance need be cited than Miller's discovery of the etiology of dental caries. His work was the final link in a long chain of evidence which had been worked out before him, and without which as a basis his result would possibly not have been reached ; just as, on the other hand, the work of his predecessors was involved in darkness until his masterly research supplied what was needed to illuminate the whole subject, and give to the work of those who had previously labored so faithfully in the same direction its full significance and value.

The etiology of pyorrhea alveolaris presents many of the obscure features which surrounded that of dental caries previous to the time when Miller announced his solution of that problem. It has been the Gordian knot of dentistry since dentistry has existed. Numberless theories have been created to explain its cause, and the whole materia medica has been drawn upon for its treatment, yet this mighty combination of drugs and often ingenious guess-work has failed to solve either its cause or to effect its cure. The most that can probably be claimed thus far on the therapeutic side is palliation, while it would be difficult, if not impossible, to state just what advance has been made with respect to its etiology.

A paper recently read by Professor C. N. Peirce before the New York Odontological Society, and published in the *International Dental Journal* for January, 1894, makes an announcement with respect to the etiology of this disorder which may well claim the attention of all dental practitioners and medical men as well.

Careful analyses, both chemical and microscopic, of concretions from or near the apices of tooth-roots, in typical pyorrhea cases, demonstrated the uniform presence of uric acid and its salts. This fact alone is of the utmost significance, for by it we not only are confronted with a fundamental chemical difference in the two classes of concretions met with in connection with the teeth, but we are furnished with valuable confirmatory evidence of their difference in origin. Dr. Peirce's paper is lacking in specific information with respect to the question whether concretions of so-called serumal or sanguinary tartar can exist upon tooth-roots without any break in the continuity of the tissues at the gingival border. His belief that it can may be inferentially assumed, and as a matter of fact he does so believe, in common with a number of other observers. Actual proof of the fact, however, seems to be wanting, there being no recorded observations, so far as we are aware, which show that such deposits have occurred upon roots of teeth with perfect continuity of the cervical gum-margin. The point is extremely important in definitely settling the question of the hæmic origin of these peculiar concretions. Given the fact that so-called sanguinary or serumal tartar is derived directly from the blood, the great importance of Dr. Peirce's observation as to the chemical composition of the deposit becomes apparent; and further, his conclusion that the particular variety of pyorrhea alveolaris consequent upon these deposits is simply one of the protean manifestations of the gouty diathesis logically follows as a corollary. The final demonstration of the correctness of this argument must necessarily be made along the lines of therapeusis. If it shall be shown that permanent cessation of the disorder and restoration to health of the tissues involved uniformly follows the intelligent application of treatment directed toward the elimination of uric acid from the system, with proper dietary restrictions for preventing its entrance, we shall have a demonstration of the accuracy of the theory as satisfactory, perhaps, as can be had for any problem of this character. The time has as yet been too short in which to test the matter, though in the limited number of cases so far observed the results have been most marked and encouraging. In its present form, and though lacking the evidence which can only be had by practical test and observation of results, the theory of Dr. Peirce as to the gouty origin of perhaps the most intractable form of pyorrhea alveolaris we believe on rational grounds, and from personal observation and study of cases, furnishes the clearest and most intelligent tentative solution of the problem that has ever been offered, and the only one thus far advanced which gives a reasonable hope of successful treatment.

A request to furnish the readers of the DENTAL COSMOS with a definite statement of his latest views has been responded to by Dr. Peirce as follows:

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—In response to the request contained in your communication of January 10, it gives me pleasure to transmit to you some further observations upon the pathology and treatment of pyorrhea alveolaris. At the November meeting of the New York Odontological Society I read a paper on "The Etiology of the Inflammatory States of the Alveolo-Cemental Membrane," which was published in the *International Dental Journal* for January, 1894. In this paper, a brief synopsis of which is here presented, the attempt was made to establish the fact that in the pathological process which has been designated phagedenic calcic pericementitis by Dr. G. V. Black, and pyorrhea alveolaris by others, are two closely allied and yet independent diseases, readily differentiated and diagnosticated. In one form of pericementitis the disease primarily begins at the gum-margins, and gradually encroaches upon the tissues in its progress toward the apex of the root, the extent of the inflammation varying from a slight gingivitis to a phagedenic inflammation of the pericemental membrane, the latter condition being more especially dependent upon some constitutional predisposition, such as lowered vitality induced by dissipation, or by scrofulous, syphilitic, or tuberculous diathesis. The exciting cause of this form of pericemental inflammation is the deposition of calcium phosphate from the saliva. This salt, accumulating at the gum-margins, gradually infiltrates itself along the cemental surface of the root, thus detaching and denuding the root of its source of vitality, the pericemental membrane. To this form of pericementitis I applied the term, based upon its causation, *ptyalogenic* calcic pericementitis, expressive of the idea that in its origin it is salivary, and that the exciting cause is the deposition of a calcium salt.

In the second form of pericementitis the disease primarily begins at or near the apical extremity of the root, and gradually advances toward the gum-margins. This pathological process may involve the cementum of one root only, or it may limit its destructive progress to the one side of one root, or all the roots of a multiple-rooted tooth may be completely denuded of their lining membrane, as evidenced by the production and continued discharge of pus and the subsequent loss of the tooth or teeth. The cause of this form of pericementitis, known from its most characteristic symptoms, the discharge of pus and thickening of gum-tissue, as pyorrhea alveolaris, is the deposition of some salt or salts from the lymph stream after its transudation through the walls of the blood-vessels. These salts, accumulating on the surfaces of the cementum and in the meshes of the alveolo-cemental membrane, act as irritants and excite the inflammatory state with its concomitants, pain, swelling, formation of pus, and solution of the alveolar process. The salts which we have deemed active in the causation of this disease have been shown by chemical analysis to consist of the calcium and sodium urates, with free uric acid and a small percentage of calcium phosphate. To this form of pericementitis I have applied the term, based upon its origin, *hæmatogenic* calcic pericementitis, expressive of the idea that in its origin it is hæmic, and that its immediate cause is the deposition of a calcium salt, in which product the uric acid is the predominating element.

That the writer is justified in differentiating these two diseases will become apparent when their symptoms are contrasted. In ptyalogenic pericementitis the disease appears generally from the twentieth to the twenty-fifth year, or at a time when the calcium salts introduced into the body with the food are in excess of its needs and no longer required to the same extent for the calcification of the tissues, and in consequence are eliminated by the salivary glands. The accumulation of these salts, sometimes enormous in quantity, seldom gives rise to severe pain or the formation of much pus. Removal of the deposit is usually followed by complete relief, the only evidence of its previous existence being the partially denuded root. If the tooth be removed, the root presents its usual or normal characteristic color. In hæmatogenic pericementitis, the disease generally appears from the thirtieth to the forty-fifth year, at a time when the food introduced into the body for tissue-growth is no longer consumed so rapidly or completely, and in consequence leads to the formation of certain characteristic waste-products, such as urea, uric acid, etc. The accumulation of the uric-acid salts, never very great in amount, is attended by pain and the formation of pus ; the alveolar process is gradually softened and absorbed. The tooth, having lost its support, is removed, and the root, on examination, is found to be horny in character, and in color at times of a yellowish hue, with a uric-acid incrustation. The disease is usually progressive, removal of the deposit affording only temporary relief. A comparison of these leading symptoms makes it evident that we have here two distinct affections to consider. If it be admitted that the exciting cause of the hæmatogenic form of pyorrhea be the deposition of uric acid and its salts, the conclusion is inevitable that the disease is but one of the many phases or manifestations of the uric-acid or gouty diathesis. If this view as to the causation and pathology of pyorrhea be even provisionally accepted, its clinical history must correspond in a general way with the clinical history of the gouty diathesis itself, and yield in a similar manner to the customary treatment of other manifestations of the diathesis.

A brief summary of the phenomena of the uric-acid diathesis may enable us to see that pyorrhea alveolaris is but one of its multiform phases. The term uric-acid diathesis, as interpreted by the pathologist, means a condition of the blood in which there is an abnormal accumulation of uric acid and its salts, due either to a defective elimination or to an increased formation, the outcome of an imperfect oxidation or assimilation of the albuminous constituents of the food. This state of the blood is to be regarded as an evidence of a corresponding disturbance of the general nutritive process, and to be looked upon as a constitutional malady which manifests itself in a great variety of ways. It would be out of place within the limits of this short response to your inquiries to attempt to discuss the many theories which have been offered from time to time as to the cause or causes which lead to the production of uric acid, or to its deposition in the various tissues of the body. Sufficient is it for our purpose to state that there is a general consensus of opinion among pathologists or clinicians that the chemical theory which associates uric-acid formations with imperfect assimilation of food, largely, though not entirely, explains the facts. The factors, however, which lead to the establishment of this faulty assimilation are numerous and multiform. Among the predisposing causes may be mentioned : 1. Heredity. Statistics show that the gouty manifestation is inherited in from sixty to eighty per cent. of cases. 2. Age. In a large majority of instances the gouty phenomena make their appearance in the years from thirty to forty, at a time when growth has ceased and food is no longer needed for tissue-growth, but only required for the molecular wear and tear of the tissues consequent upon their functional activity, and for the production of heat. 3. The consumption of excessive quantities of both albuminous and starchy foods, fermented liquors, the richer claret wines, etc., are co-operative factors in impairing the nutrition. 4. Sedentary occupations necessarily associated with diminished physical exercise will favor the imperfect oxidation of food, and also retard elimination of waste-products.

The writer is satisfied that a correct clinical history of patients affected with pyorrhea alveolaris (hæmatogenic calcic pericementitis) will reveal the fact that a very large proportion, if not all, will have been the victims of some one or more of the above-mentioned factors, which have so disturbed functional activity as to result in the accumulation of uric acid in the blood previous to its deposition in the tissues. Preceding any local manifestation, then, there is recognized a diminution in the alkalinity of the blood, which, according to some authorities, is the immediate cause of imperfect elimination of uric-acid products by the kidneys. In consequence of this, the uric acid transudes through the walls of the blood-vessels with the lymph stream, and undergoes deposition and crystallization in the connective tissues.

As an evidence of the universal invasion of these tissues by uric-acid salts, it is stated by pathologists that there is scarcely a tissue or organ which has not been found to be the seat of the deposit, leading to an alteration in its structure and functional activity. Regarding the character of the tissue involved, the following classification has been made : 1. Articular gout, in which the deposit occurs in the joints, and which may be acute or chronic. 2. Parenchymatous or visceral gout, in which the deposit occurs in the viscera, such as the lungs, heart, spleen, liver, kidneys, etc., giving rise to various forms of disease, or giving a peculiar cast to diseases already established. 3. Nervous gout, in which the nervous tissue is invaded, and manifesting itself in a loss of mental energy, despondency, irritability of temper, headaches, neuralgias, etc. 4. Tegumentary gout, in which the deposit takes place in the skin and mucous membrane. Catarrhal affections of mucous membrane, such as pharyngitis, chronic bronchitis, gastric and intestinal catarrhs, with other functional disturbances, are of frequent occurrence. Diseases of the skin, such as eczema, psoriasis, and other forms, have long been recognized as among the possible transformations or expressions of gout.

A careful examination of our pyorrhea patients will most certainly disclose the fact that in one or more ways some of the above-described manifestations of gout are present. If any dental practitioner will, when meeting with his pyorrhea cases or patients, direct his attention not only to the local phase of the disorder, but especially to its constitutional or remote local concomitants, there can be hardly a doubt that the true character of pyorrhea alveolaris will soon be recognized. Considering the almost universal systemic manifestation of gout, it is not at all strange or impossible that the alveolo-cemental membrane should become the seat of the uric-acid deposit, and, indeed, that this is the case has, I think, been proven by the presence of this acid and its salts in and beneath this membrane and on the surface of the cementum. Chemical analysis, as I have already reported, has revealed the existence of uric salts in the incrustation covering the apical extremities of the roots. Corroborative testimony is provided by Dr. Dyce Duckworth, of high authority on gout, who, in a recently published work, states that "a tendency to shed sound teeth has been noticed with some frequency in middle or later life in gouty-disposed persons."

The manner in which this uric-acid deposit gives rise to the symptoms and pathological results of pyorrhea has been explained in my communication already referred to, therefore need not be repeated here.

While the application of the uric-acid theory which I have advanced, and the treatment indicated by the assumption of its correctness, has not been in practice sufficiently long to make record of cures, yet the six weeks' trial of restricted diet, with the conscientious use of the therapeutic agents deemed necessary, have given such marked evidence of improvement that I take pleasure in making record to this extent, with the citation of but a single case. E. M., age forty-two. Family history strongly gouty on paternal side. Father had calculi in bladder, which were removed by surgical interference; other symptons of gout were constantly present in throat and larynx, as stated by his medical attendants. Pyorrhea was present for fifteen years, or until all the teeth were loosened and removed. The patient under consideration began to suffer with symptoms of pyorrhea several months since, which affected the inferior incisors and right first inferior molars. The disease suddenly became marked, and soon presented the usual symptoms. Under the restricted meat diet and regulation of the functions of the liver and bowels by means of Hunyadi water, which contains largely sulfate of soda, a remedy highly recommended for the relief of gout, the disease rapidly subsided, and at the end of two months it may be said that the patient, so much improved, is practically well. The discharge of pus has ceased, the turgescence, thickening, and purplish color of the gum has disappeared, and the teeth have regained their normal degree of firmness.

In addition to the local treatment, which has already been published more than once, I close this with a few words on restricted diet. The patients under care with the view of ascertaining the practical and clinical value of the assumption herein embraced, are in their albuminous diet confined to oysters, fish, white meat of chicken, and skim-milk, while the therapeutic treatment has in one case been as above noted, with Hunyadi water night and morning, and in the others *five-grain* tablets of *lithium citrate*, one taken morning, noon, and night, three each day, in a tumbler of moderately cold or hot water. The future will reveal the result of this treatment, which shall be given to the profession as soon as ascertained.

C. N. Peirce.

JURY SERVICE BY DENTISTS IN MISSOURI.

There appears to be a good field for dental missionary work among the legal lights of Missouri, for according to the St. Louis *Post-Dispatch* an opinion was handed down in court in banc on December 5, 1893, by Judge Sherwood, and concurred in by Judges Barclay, Gantt, and Burgess, which settles the question as to the liability of dentists to perform jury service. The majority of the court hold that a dentist is neither a doctor nor a surgeon so far as his profession is prescribed by Missouri law, and is not, therefore, exempt from jury service as an M.D.

This opinion, however, is dissented from by Judges Brace, Black, and Macfarlane, they holding a diametrically opposite view. But four being a majority of the court, the opinion stands as law.

Judge Sherwood's opinion closes with the following:

> "The disposition of persons to magnify and exalt their callings or occupations has become wonderfully prevalent in these latter days. He who shoves a jack-plane and wields a saw is no longer a 'carpenter,' but an 'architect and builder.' The solicitor of orders from our retail merchants is no longer a 'drummer,' but a 'commercial traveler;' and the loquacious individual who scrapes your chin is no longer a 'barber,' but a 'tonsorial artist.' But this euphemistic style of dressing things in different and more high-sounding verbiage does not alter their essential nature, nor has the least tendency to evade the force and effect of the statutes pointing out those who are subject to jury duty and those exempt therefrom. A tooth-doctor is no more exempt than he who is content to be dubbed 'corn-doctor.'"

The views of the learned judge respecting the essential nature of the dental calling would probably suffer modification if the ends of retributive justice in his case should be worked out in the personal experience of an acute pericementitis while his dentist was doing jury duty. The grounds upon which exemption of dentists from jury service has heretofore been secured have been the prior right of the patient to the services of his dentist, for exactly the same reasons upon which he is accorded the prior right to the services of his physician, as was stated in the Dental Cosmos for May of last year.

This view was probably not presented in the Missouri case, or, if so, does not appear to have been taken into account. The exemption of dentists from jury duty is important both to dentists and the community, and such exemption has been accorded in courts where the equity of the request has been properly presented. A failure to secure exemption cannot be justly charged to judicial ignorance or lack of understanding when a plea to that end has been imperfectly or improperly presented.

It is important therefore in any similar proceeding to follow the precedent methods which have resulted successfully in such cases in other states.

We are constantly in receipt of inquiries respecting the number of States and Territories in the United States having laws regulating the practice of dentistry.

According to the most reliable sources of information at our command, we may state for the benefit of the uninformed that at this date all the States and Territories have dental laws except the following: Alaska, Idaho, Indian Territory, Montana, Nevada, and Utah.

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BIBLIOGRAPHICAL.

Messrs. Lea Brothers & Co. announce for early delivery a new edition—the fifth—of The National Dispensatory, which is now almost ready for publication. The work will contain the latest and ripest knowledge of the late John M. Maisch, who had practically completed before his death the sections assigned to him.

The therapeutical department has been brought thoroughly abreast of the times by Professor Alfred Stillé, M.D., who has included critical statements of the value of even the newest remedial agents. The National Dispensatory covers by authorization the new United States Pharmacopœia. It contains many new tables, lists, and descriptions of new processes and tests, and will be a work of indispensable value to all who have to do with any of the medical sciences.

Minor Surgery and Bandaging. By Henry R. Wharton, M.D., Demonstrator of Surgery in the University of Pennsylvania. 12mo, pp. 529, with 416 engravings. Philadelphia: Lea Brothers & Co., 1893. Price, cloth, $3.00.

The author has included within the limits of his title much more than is usually classed as minor surgery. In fact, the number of major operations described is large enough to justify a broader title. The descriptions are exceedingly clear and satisfactory. The illustrations are largely from photographs of actual cases, and add much to the value of the descriptive text.

The details of antiseptic surgery are minutely dealt with, and altogether the book is a most interesting and valuable addition to the list of surgical reference and guide-books.

A DICTIONARY OF MEDICAL SCIENCE. Containing a full explanation of the various subjects and terms of Anatomy, Physiology, Medical Chemistry, Pharmacy, Pharmacology, Therapeutics, Medicine, Hygiene, Dietetics, Pathology, Surgery, Bacteriology, Ophthalmology, Otology, Laryngology, Dermatology, Gynecology, Obstetrics, Pediatrics, Medical Jurisprudence, and Dentistry, etc., etc. By ROBLEY DUNGLISON, M.D., LL.D., late Professor of Institutes of Medicine in the Jefferson Medical College of Philadelphia. Edited by RICHARD J. DUNGLISON, A.M., M.D. New (21st) edition, thoroughly revised, greatly enlarged and improved, with the Pronunciation, Accentuation, and Derivation of the Terms. Imperial octavo, pp. 1181. Philadelphia : Lea Brothers & Co., 1893. Price, cloth, $7.00 ; leather, $8.00.

This recognized standard work is almost a new book in the present edition. Forty-four thousand new words and phrases have been included, and much obsolete matter thrown out. These changes have added about one hundred pages to the present edition. A new feature is the pronunciation, which has been added in the form of clear phonetic spelling. The author retains the final *e* in the spelling of dentine, as does Gould, while Duane, Foster, and the Century Dictionary drop it. There should be some authoritative expression from the dental profession upon the spelling of this word ; the tendency is now to spell it without the final *e*, and it will probably become general in time.

We find the word morsal regularly incorporated both in this and in Foster's Dictionary.

Dunglison's Dictionary in its present shape cannot fail to retain its well-earned supremacy as the authority in its field.

SURGERY. By BERN B. GALLAUDET, M.D., Demonstrator of Anatomy and Clinical Lecturer on Surgery, College of Physicians and Surgeons, New York, Visiting Surgeon, Bellevue Hospital, New York ; and CHARLES N. DIXON-JONES, M.D., Assistant Surgeon, Out-Patient Department Presbyterian Hospital, New York. Being the final volume of The Students' Quiz Series, edited by BERN B. GALLAUDET, M.D. Duodecimo, pp. 291. Philadelphia : Lea Brothers & Co., 1893. Price, cloth, $1.75.

This volume marks the completion of The Students' Quiz Series, which has received favorable notice in this journal as the several new volumes of the series have appeared. The present one is fully in harmony with its predecessors, and is essentially a students' book on surgery in which the principles and practice of the art are well explained in exceedingly terse style.

The illustrations are profuse and excellent. They add much to the teaching value of the book.

PEARSON'S DENTAL APPOINTMENT BOOK FOR 1894.

This welcome annual visitor is again presented in its usual convenient and attractive form. R. I. Pearson & Co., publishers, Kansas City, Mo., and Memphis, Tenn.

PAMPHLETS RECEIVED.

Proceedings of the National Association of Dental Faculties. Tenth annual meeting, held in Chicago, August 10 and 11, 1893. Constitution and Codified Rules.

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OBITUARY.

DR. SAMUEL J. DICKEY.

DIED, at his home in Philadelphia, January 4, 1894, after a short illness of pneumonia, Dr. SAMUEL J. DICKEY, aged seventy-four years.

At the age of eighteen Dr. Dickey entered upon commercial life as a bookkeeper for his uncle, who was largely engaged in the manufacture and sale of hats. After about two years of service in this connection his health broke down, owing to the burden of business cares thrust upon him, and after a severe illness with slow recovery he took up the study of dentistry in a private office, subsequently entering upon practice for himself.

Dr. Dickey, besides being well and favorably known as a dentist, was prominent in the Masonic order. He held active membership in a number of lodges, was Past Master of Mozart Lodge, No. 436, of Pennsylvania, and its representative to the Grand Lodge of that state. He was an acknowledged authority upon Masonic affairs, and was universally respected and beloved wherever he was known throughout the order. He was buried with Masonic rites, January 8, 1894.

DR. DANIEL NEALL.

DR. NEALL died at his residence in Philadelphia, after an illness of several years, on January 6, 1894, in the seventy-seventh year of his age. He began the practice of his profession after having studied dentistry with his father, Daniel Neall, a man of high worth and integrity, and a practitioner of great ability, who was one of the few pioneer dentists in Philadelphia. He achieved great success in his work, and enjoyed a large practice for many years. The honorary degree of D.D.S. was conferred upon him by the old Philadelphia Dental College, the predecessor of the present Pennsylvania College of Dental Surgery, at its first annual commencement, held February 28, 1853.

During the period of his dental practice, Dr. Neall had associated with him successively as partners, Dr. John Hugh McQuillen, Dr. Franklin M. Dixon, and Dr. J. A. Woodward. He was a member of several dental societies, being one of the organizers of the Philadelphia Dental Club, and also of the Odontological Society of Pennsylvania. Of the latter he was elected its first president. In these organizations he retained his membership until the date of his retirement from active practice, in 1887.

To those who enjoyed the intimate friendship of Dr. Neall it will always be a pleasure to recall his genial, happy nature. He was full of quaint humor, and we who knew him best will always remember with pleasure the many bright, happy hours spent in his companionship. He was ready at all times to aid those needing his assistance or encouragement, and was particularly kind to the younger members of his profession.

I can but speak of his intense love for children. It is a frequent pleasure to hear him spoken of, by some one of those who as children were under his professional care, as one to whom they went with pleasure, being sure of kind and sympathetic treatment.

His ability and integrity were conspicuous among the sterling, manly qualities which made him a power among those with whom he was thrown in contact. He possessed a strong individuality, combined with a magnetic nature which attracted others to him and made them his friends. Whether his voice was heard in society discussion or when giving friendly counsel, it always carried with it the forcefulness of an honest, right-minded purpose to help his fellow-men.

DANIEL NEALL MCQUILLEN.

DR. CHARLES H. OSGOOD.

THE following resolutions were adopted at the meeting of the Boston Dental College Alumni Association, December 13, 1893 :

WHEREAS, That silent messenger, death, has again invaded our ranks and taken one of its most earnest and esteemed members, a former president of this association ; therefore be it

Resolved, That in the death of Dr. Charles H. Osgood the Alumni Association, as well as the Boston Dental College, have sustained a loss which will be long felt. To him, perhaps as much as to any other graduate, in his interested and valuable services, is due the high standing to which the college has attained ;

Resolved, That we extend our sincere sympathy to his bereaved family in this their sad affliction ;

Resolved, That these resolutions be entered on the records, and a copy be sent to the family of the deceased, and to the several dental journals for publication.

STEPHEN G. STEVENS,
JAMES H. DALY,
R. R. ANDREWS,
} *Committee.*

PERISCOPE.

AN ORIGINAL METHOD OF RESTORING THE ALVEOLAR ARCH IN ANTERIOR CLEFT OF THE HARD PALATE AND OF CORRECTING THE DEFORMITY OF THE ALÆ NASI IN HARELIP.—Wyeth (*Journal of the American Medical Association*, August, 1893) says that it is common experience, after plastic work on the soft parts in cases of complete harelip and cleft palate, for the ala nasi of the affected side to still remain misshapen, flat, and sunken.

If the maxilla be normal and the alveolar arch in front complete, each ala nasi rests upon a bony surface and foundation on the same plane, and the two are naturally symmetrical. If one is deficient, the nostril of that side sinks down and out of line, just as the corner of a house does when the underpinning is not high enough. In certain cases of anterior cleft the intermaxillary process is adherent to one side (long side) and projects in a clumsy fashion, usually to the front and upward. In these cases the old method of bending or forcing this misplaced process over to the short side and holding it in contact until union has taken place completes the arch and gives a suitable foundation for successful plastic work on the nostril and lip.

When, however, this process is absent or largely deficient, we find one ala nasi resting upon a normal portion of the alveolar arch on one side, while on the other it recedes from one-half to one-quarter of an inch, resting upon an imperfect maxilla and alveolar process.

In four such cases the following operation was devised and carried out: About one-quarter of an inch from the edges which are to be brought in apposition a hole was drilled through the bone and a strong silver wire carried through, ready to be tightened.

The edges were freshened by slicing off the mucous membrane lining the bone with a strong scalpel or scissors. With a very strong pair of scissors in very young infants, or a bone-cutter, the alveolar arch and maxilla of the short side was divided about half-way of its length and at right angles to the dental surface. By introducing a stout cord of silk or wire into this fissure, and making strong traction forward, the undivided portion was fractured and loosened, when, by tightening and twisting the silver wire previously introduced, it was brought forward and firmly anchored.

Since the nutrition of the bone in its new position is derived temporarily from the adherent soft parts, these are not disturbed until the bone unites in its new position. From six to eight weeks should elapse before plastic work on the lip and nose is undertaken.

Early operation is essential, always within the first years of life, and preferably within the first few weeks after birth, provided that the nutrition of the child be good or can be improved by forced feeding.—*Therapeutic Gazette.*

New Operation for Bad Cleft Palate.—Mr. Arbuthnot Lane operated on a case of cleft palate by means of a method which he had adopted on a previous occasion. The child was two years of age. The upper lip, with the hard and soft palate, was cleft from before backward, and the cleft in the palate was of such a nature that it was hopeless to attempt to close it by any of the usual methods. On one side the plate terminated by an oblique junction with the lower end of the vomer, while on the other side there existed only the alveolus, which above was directly continuous with the inferior meatus of the nose. Mr. Lane removed the mucous membrane from the margin of the hard palate on the one side, and on the other he stripped the mucous membrane from the inferior turbinated bone and from the inferior meatus, and so formed a good-sized flap of mucous tissue and periosteum whose base was continuous with the mucous membrane lining the inner aspect of the alveolus which formed one boundary of the cleft. This flap was then made to cover in the cleft, being connected by a continuous suture with the opposing freshened edge. There was no possibility at the time of bringing the edges of the soft palate together, so this portion of the operation was postponed till the hard palate had developed a little. Nothing could have been more satisfactory than the result which was obtained from this method. Mr. Lane pointed out that it admitted of a tolerably wide application, though he had seen very few cases like the above in which it was so peculiarly applicable, and which were apparently not capable of being treated by the ordinary methods.—*Med. Press and Circular.*

Rubber Cement, Elastic.—The *India-Rubber World* recommends the following: Carbon bisulfid, 4 oz.; India-rubber in fine shreds, 1 oz.; isinglass, 2 drm.; gutta-percha, ½ oz.; dissolve. Used for joining leather or India-rubber. The parts must be thinly coated with the solution, which is left for a few minutes to dry, and then heated to melting; the parts are placed in close contact, and the air-bubbles are well hammered out. Leather—gutta-percha dissolved in carbon bisulfid, to form a mass of treacly consistence, or gutta-percha, 1 lb.; India-rubber, 4 oz.; pitch, 2 oz.; shellac, 1 oz.; linseed oil, 2 oz.; melted together it will answer the same purpose as the elastic cement described above.—*Pacific Record of Med. and Surg.*

HINTS, QUERIES, AND COMMENTS.

In reply to Dr. M. C. Marshall's query in the January number of the Dental Cosmos, I would advise that the tooth be let alone for the present, provided it gives no inconvenience; but watch it closely.—Robert K. Luckie, Holly Springs, Miss.

To the Editor of the Dental Cosmos:

Sir,—Is "honesty the best policy"?

A woman came into my office a few days ago to have four teeth extracted. Upon examination, I found two of the teeth were sound, and two had very small cavities. I told her she ought not to have them extracted, but filled. This she refused to do, and all the arguments I could bring to bear upon her were of no avail. She left my office, and went into that of another dentist. To satisfy my curiosity, I watched, and soon saw her reappear, giving the usual indications of having had teeth extracted,—viz, holding her handkerchief over her mouth and spitting out blood.

I wish to ask the profession, Did I do my duty in refusing to accede to her wishes; or would I have been justified in extracting her teeth, knowing that if I did not, in all probability some other dentist would?—E. L. H.

[In our opinion honesty still continues to be the best policy. The ethics of the other course suggested would be about the same as stealing the patient's pocket-book because some thief was more than likely to do it.—Ed. Dental Cosmos.]

To Properly Articulate a Set of Teeth.—Having to make a full upper set of teeth, we will suppose the impression and model to have been made in the usual way. Take modelling composition, soften and flatten it out until it is about a quarter of an inch thick; press it on the model while warm, and then cut and trim to make a trial plate for the purpose of taking a bite. It should accurately fit the model. Melt a little wax around on the ridge, then press a roll of softened wax on that, and trim to what you think would be a sufficient length, then try in the mouth and carefully trim the lower edge to the proper length for the teeth; if it is not, either add to or cut away until it is found by trying in the mouth that the wax represents the proper length. This wax should be so cut on its articulating surface that all the lower natural teeth will strike it at the same time when tried in the mouth. Now remove and soften the articulating wax surface just a little over the flame, then replace in the mouth, and do not let patient bite into it until you have the head drawn well back so as to put the anterior muscles of the neck on a stretch; then have the patient bite a little on the wax just to get an impression of the cusps and cutting-edges of all the lower teeth. Next take an accurate impression of the lower teeth, from which make a plaster model, which will fit into the slight impressions of the teeth made in the bite taken, and then place the whole on any good articulator which can be set to maintain the relative positions. Remove the bite, and you are ready to set the teeth to a correct articulation, and if all has been carefully done the teeth will come together properly without any subsequent grinding.

For a double set (upper and lower) make trial plates of modelling composition to take the bite on, putting a piece of rather stiff wire in the lower one to stiffen it. Wax the ridges as previously prescribed. Place a roll of softened wax on the upper trial plate, place the lower trial plate in the mouth, being careful to see that it is in its proper place, and hold it there while putting in the upper plate with the wax on it. Do not allow the patient to bite until the head is drawn back as far as you can get it; then tell the patient to bite, and keep the jaws closed until with one finger the wax has been well pressed onto the trial plates. Mark the center or median line on the wax. Have patient close the lips, and then take a small, straight instrument and mark on the wax the height of the lower lip. This mark should extend from one angle of the mouth to the other; you then have the line of fissure or line of lip-closure; in other words, the height of the lower lip and length of the upper to serve as a guide in making the wax models. After thus taking the bite, place each of the models in the bite so obtained, and fasten in any good articulator; then prepare corresponding wax models, which should be tried in the mouth to verify their correctness. They should come together in the mouth the same as on the articulator, and if they do not they should be made to do so before proceeding further. Take pains to be satisfied that the wax models are correctly adjusted and give a natural expression to all the facial features, observing that the lower third of the wax model is in proper proportion or length with the upper two-thirds, and be sure to produce the proper fullness over the region of the upper cuspids to give as near as possible the natural contour. Then take the upper and lower plaster models off the metal articulator, and make a plaster extension to the back part of upper model, on which place the wax models, which have been marked while in the mouth so that they can be put in the same position out of the mouth. The lower plaster model is placed in position, and a plaster extension added to fit to that of the upper plaster model. After separating these, the lower wax model is placed on the lower plaster model, and the inside space filled with wet paper, and plaster is poured over all to make the lower articulating plate to which the lower teeth are to be set. Next place the upper model in position, and set the upper teeth to the lower ones which have just been set to the lower articulating plate, and when ready for flasking, if for vulcanite plates, saw off articulating ends. Always set the lower teeth first.

Having made double sets in this way for twenty-five years without having to do any grinding after placing them in the mouth, I think that I have some claim to the conclusion that this method is a pretty good one.

Dr. F. Jay Raymond writes to tell me that he has used my method with unvarying success, employing also gutta-percha base-plates instead of the modelling composition. He uses rubber-dam to keep the mixed plaster from the bench when forming the plaster articulator extensions.—J. G. TEMPLETON, Pittsburgh, Pa.

A COUPLE OF TRIFLES.—Too often it is assumed that others must certainly know of the various devices by which dental work is facilitated. A few years ago, my friend, Dr. S. B. Palmer, of Syracuse, surprised me by stating that I need not make undercuttings in repairing vulcanite plates; that if the surfaces were freshened and painted over with a solution of the unvulcanized caoutchouc, the new material would unite with it.

Later I found that all with whom I conversed on that subject had long known it, and, they added, "you will find that wetting the freshened surfaces with kerosene will answer equally well,'' while another said, ''you need not even add any solvent, but merely freshen the surfaces.''

Thus it was that I, for more than thirty years a diligent and careful reader of the dental journals, had failed to hear the ''still, small voice'' with which this boon was given to our beloved calling.

At a public clinic, attended by nearly three hundred dentists, and held in the rooms of The S. S. White Dental Manufacturing Company, in New York city, in November, Dr. Day, a most ingenious and skillful mechanical dentist, exhibited a novel method of expediting the packing of cases. He first applied shellac varnish to his cast, allowed the varnish to harden, then added the vulcanite in pieces of from a half-inch square or larger, pressing each down on the cast firmly and smoothing down any prominences with a warm spatula until the whole surface was covered and the building up around the teeth completed as desired. The case was then flasked at one pouring, and was ready for the vulcanizer as soon as the plaster had set.

The first case presenting after the clinic, I tried the method, with this modification. I like to have my plates come out finished on the side next the gum; hence, after shellacking, I cover the surface of the cast with No. 20 tin foil, and burnish it smooth. Next, I take a piece of the vulcanite in tweezers, dip it in chloroform, and paint over all the surface of the tin to which I wish the rubber to adhere,—and it does adhere.

My subsequent management is the same as Dr. Day's. I find that the plates thus made are dense, tough, and strong, the expansion of the gum during vulcanization sufficing to fill any interstices that have escaped attention in packing.

Another ''Dodge.''—Whether with gold work or vulcanite, it often happens that from the dragging of the impression the cast has been misleading, and when the adjustment of the completed plate comes to be made the clasp is found to stand away from the tooth too far for the comfort of either dentist or patient. To overcome this difficulty, or rather to prevent it, I have devised this plan: Cutting a clasp from a rather thin piece of clasp stuff, and having it run lengthwise of the fiber of the gold as made in rolling, and regularly tapered from the broader end to the narrower, I bend about half an inch of the smaller end (for a molar, less for a smaller tooth) back upon itself, annealing two or three times, while doing so, to avoid fracture. This doubled part is then bent to fit the tooth to be clasped; the tip portion being on the concave side, and therefore next the tooth. It will be readily seen that this method increases the opportunity for adjustment, and allows greater movement of the spring in case of leaning teeth.—J. S. LATIMER, D.D.S.

THE DENTAL ENGINE IN SURGICAL WORK.—The manifest adaptability of the dental engine to the performance of a large class of surgical operations, especially those upon bone-structure, has long been apparent to every thinking dentist whose familiarity with the possibilities of this instrument is the result of experience in its use. The extreme delicacy of manipulation which practice with the dental engine gives, the exalted tactile sense developed by it, the precision and accuracy of its work when intelligently used, are all self-evident facts to the dental profession. General surgeons have been slow to adopt it in their work, probably because of the amount of practice usually necessary to acquire a working facility in its use that may at all times be depended upon. The advocacy of the dental engine and its prototype, the surgical engine, has been strongly put forth by Bonwill, Cryer, Brophy, and the class of oral surgeons whose first practical knowledge of the usefulness of the instrument has been gained in dental practice, and is well known to readers of dental literature. The acceptance of the engine by general surgeons has, however, been tardy, though it now appears to be winning favor by them in certain classes of work. The *Medical News* (April, 1893) contains an article upon "Closure of the Ear by Growths of Bone; Removal of Bony Obstructions; Cure of Otorrhea and of Deafness. Three Cases; Description of Operations, Instruments, etc.," by Robert Barclay, A.M., M.D., St. Louis, Mo., in which, speaking of past and present methods for the surgical treatment of these cases, he says,—

"To those afflicted with the disease in former days, grave must have been the prognosis declared, to compel, as it did, their submission to the intense and prolonged agony inevitable upon the surgical operation before the days of anesthesia and perfected mechanical arts.

"Consider, on the other hand, the manifold advantages of our modern method of dealing with such aural bony growths by means of the dental engine. In operating with this instrument, the hand-piece may be held and guided like a pen, skill and attention being addressed principally to directing the reamer, or bur, inasmuch as this operates, with but slight manual pressure, mainly by the rapid revolution of its cutting-edges. A little experience in the use of the dental engine and drill is sufficient to educate the operator in determining by touch and resistance the nature or condition of the tissue upon which the tool is operating, thereby affording another and more reliable indication as to the desirability of extending or terminating the process of operation at that particular spot. With this there is a minimum of risk of injury to contiguous or neighboring healthy parts through direct or through transmitted force. In careful hands this instrument cannot slip away or plunge. No concussion, no cracking, no roughness, no projecting spiculæ, no splinters of bone,—only a smooth, clean-cut surface marks its trail."

Dr. Frederick Peterson, of New York, who forwards for the benefit of Cosmos readers the following item respecting spasm of the masticatory muscles, induced presumably by irritations of dental origin, furnishes also the report of an additional case of the same character, with the view to calling attention to the difficulty and eliciting from dental practitioners the reports of any similar cases which they may have observed.

Clonic Spasm of the Muscles of Mastication. (*New York Med. Journal*, March, 1893.)—At the New York Neurological Society, March 7, 1893, Dr. Peterson showed a case of this affection in which there was a continuous clonic spasm of the masseters, temporals, and pterygoids, the jaw being opened and shut slightly, and moved from side to side. In attempting to speak, the mouth was widely opened and the jaw subluxated downward and forward. The patient was a woman, aged fifty-seven, who six years before had undergone extensive dental operations. To the work about the mouth, and the necessity for keeping her mouth open for long periods of time whilst in the dentist's chair, the spasm was attributed.

To the Editor of the Dental Cosmos:

Sir,—The above item refers to the first of my cases of serial clonic pterygoid and masseter spasm,—due, I think, to long-continued work upon the teeth. My second case was in every respect the same. She was a woman, aged sixty-six, who two years ago had her three or four remaining teeth removed and two sets of teeth put into her jaws. These not fitting and causing great discomfort and irritation, after four months she had new sets made,—in fact, in a year's time she had no fewer than six renewals of teeth for both jaws. It was during this time that the spasm of the masticatory muscles began, and grew worse gradually. The spasm involves the masseters and pterygoids of both sides, and the protrusors of the tongue. The lower jaw moves up and down, and from side to side ; the tongue is pushed out and in ; and this spasm goes on all day, only ceasing during sleep.—F. PETERSON.

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A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a Thesis.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING DECEMBER, 1893.

December 5.—No. 509,901, to Horace Hobbs. Extensible dental engine bracket.
" " No. 510,048, to Oscar H. Pieper. Electrical apparatus for operating dental implements.
December 12.—No. 510,484, to Leroy S. Pfouts. Dental engine.
" " No. 510,856, to Peter V. Guerry. Brake for dental engine.
December 19.—No. 510,963, to Alonzo J. Douds and Frank F. Douds. Dentists' device for saving gold fillings.
" " No. 511,029, to C. M. Spencer. Dental hand-piece.
" " No. 511,067, to Harry Walter. Dental forceps.
" " No. 511,256, to George B. Snow. Gas regulator for vulcanizers.
December 26.—No. 511,619, to James W. Ivory. Teeth separator.
" " No. 511,621, to William A. Johnston, Arthur W. Browne, and John C. Davidson. Electric-motor apparatus.
" " No. 511,629, to John W. Lyon. Vulcanizing apparatus.

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ORIGINAL COMMUNICATIONS.

ULCERATION AND ABSCESS OF THE DENTAL PULP.

BY HENRY BURCHARD, M.D., D.D.S., PHILADELPHIA, PA.

Definition.—A condition following an inflammation of the dental pulp, attended by a formation of pus on the surface or in the substance of that organ.

History.—Until the time of Salter, confounded and confused with conditions other than it. In his work is given a description which agrees almost entirely with views to-day. Professor G. V. Black, in the "American System of Dentistry," records the most valuable data regarding the disease.

Etiology.—Follows acute or chronic inflammation of the pulp, most commonly the sub-acute varieties. Cases of ulceration are perhaps invariably associated with exposure of the pulp, and the consequent ingress of micro-organisms to the surface of the organ.

Next to this in point of frequency as to cause will be placed response to thermal changes after filling

Blows, slowly given, causing coagulation-necrosis, perhaps always produce abscess of the pulp. The blow, if severe, may cause immediate death of the pulp.

When such teeth are opened, the contents of the pulp-canal may be found in a condition of fatty degeneration, in some cases in a state of putrefactive decomposition.

We may ascribe as cause any irritation of sufficient intensity to carry the activity of the pulp beyond the constructive process until functional action is lost.

Intermediate between the constructive process and that of abscess may be placed such cases as described by Professor C. N. Peirce, the absorption of the walls of the pulp-chamber, substantially a resorption, the same process as resorption of the roots of teeth.

It may be said, as a rule, however, that thermal change is only secondary in frequency to exposure as a cause.

Morbid Anatomy, Macroscopic.—It is not necessary that a tooth-pulp be exposed to permit the invasion of pathogenic organisms.

Dr. E. C. Kirk has in his possession a slide showing the contour of the pulp-chamber to be unbroken, and yet certain faint lines may be seen extending from a cavity of decay rather distant to within a microscopic distance of the pulp-chamber. These are tubuli, filled with cocci, etc.

This is not necessarily the rod-like territory of discoloration shown in ground sections, which extends from the floor of a filled cavity in a direct line to the roof of the pulp-chamber.

Upon opening the pulp-chamber (without wounding the pulp), pus may be found occupying part of the space.

This corresponds to the loss of more or less pulp-substance through the process of ulceration. There is usually discoloration of the dentine bounding that portion of the cavity.

Or, the pulp may apparently have its periphery intact; but the pricking of the exposed organ is followed by an escape of pus, at times a surprising amount, showing the condition here to be one of true abscess.

Microscopic Anatomy.—The slide to which allusion has been made shows tubuli invaded in direct lines. The adjacent tubuli and the transverse processes apparently are unaffected. In view of this depth of invasion, it may not be mal-apropos to here call attention to the importance of Professor W. D. Miller's article on the length of time necessary for sterilization of cavities of decay.

If the condition be one of ulceration, the boundary cells, the odontoblasts, and the pear-shaped cells have disappeared, and there is an excavation extending into the pulp-substance. The walls of the excavation are ragged and covered with pus-cells, *débris*, etc., as in any ulcer. Beneath these there is an area of inflammatory degeneration; the tissue composed mainly of round indifferent cells; the polygonal corpuscles very scanty; some remains of what appear to be nerve-fibers (a point which chlorid-of-gold staining would determine). Pulps in this condition do not seem to react well to stains,—an evidence of coagulation-necrosis. The capillaries are distended and filled with coagulated blood. The writer has not seen the vessels dilated into ampullæ, as described by Salter, but there have been appearances closely simulating it. The condition is very like the irritable ulcer of the surgeon. (See Fig. 1.)

Dr. G. V. Black calls attention to the suppurative process following the direction of the veins,—a natural consequence, as this is the way of least resistance.

The appearance will depend upon the time at which the case is seen. The ulceration may be superficial, or the entire substance of the pulp may be lost.

There may exist abscess proper,—that is, there may be a cavity within the pulp containing pus, without the destruction of the periphery of the pulp.

Fig. 2 shows a transverse section of the pulp of an inferior bicuspid; the history, one of repeated attacks of sub-acute pulpitis. The duration of the trouble has, however, been sufficient to produce changes which would not exist at an earlier period.

The blood-vessels between the abscess-cavity and the periphery are occluded.

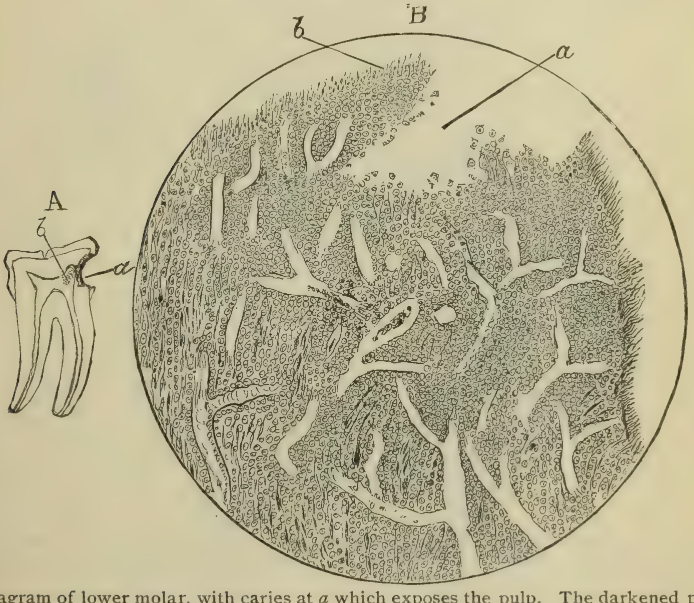
A case figured by Professor Black in the "American System of

Dentistry" corresponds very closely with this case, except in the latter the periphery was not destroyed, an abscess-cavity occupying one-third the interior of the pulp. (See Fig. 3.)

Pathology. Ulceration.—An organ of extreme delicacy, normally very efficiently protected, loses that protection, and the organ is subjected to irritation. This may be of sufficient intensity to give warning through severe suffering, or, as in cases under consideration, the process is a sluggish one. The boundary cells of the pulp have necessarily their vitality weakened through loss of their terminal portions, and soon succumb.

After this the process generally becomes one resembling coagulation-necrosis rather than true ulceration, the capillaries are blocked, and the changes are those of decomposition instead of inflammation.

FIG. 1.



A, diagram of lower molar, with caries at *a* which exposes the pulp. The darkened portion at *b* shows the extent of the inflammation. The rest of the organ was free from inflammatory change.
B, illustration of the inflamed tissue, showing a part destroyed by suppuration at *a*. The odontoblasts are undermined at *b*. The blood-vessels which were filled with blood-clot in the section are left blank here, that they may be more apparent.

In cases of abscess, the repeated irritation arises from increased conductivity, transmitted through a metal filling. Shock after shock, and the normal resistance of the organ is gone. The vitality, the power of resistance, and the resiliency of the blood-vessels disappear, and we have an inflammation, and, under the circumstances, consequent degeneration.

Salter gives cuts, taken from blood-vessels of pulps which have been the subjects of inflammation. They are dilated into ampullæ (as he terms them). They are aneurisms in miniature.

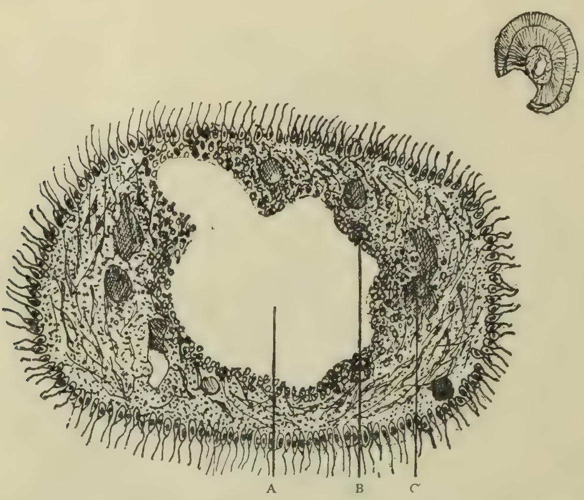
Some of the cases from which they were taken gave but *moderate* symptoms of disturbance. In view of this fact, the existence of such vascular change is most significant.

Clinical History.—A tooth which is or has been the subject of caries has a history of exalted sensitivity. The response to thermal changes increases gradually. This is followed by a stage of lessening response to cold, and an increased evidence of presence through an application of heat.

This proceeds until, in the later stages, nothing but decided cold, such as syringing with cold water, gives any sensation other than tactile. Heat, on the contrary, such as a mouthful of hot liquid, causes discomfort at times to the extent of a paroxysm of pain. The pain caused by the application of heat is lessened or overcome through a secondary use of cold. The pain is more severe in closed cavities.

Evidently the gases of decomposition are expanded by the heat, this causing the pain. Contracted by cold, there is an amelioration of the suffering.

FIG. 2.



Transverse section of inferior bicuspid pulp, one-half diagrammatic; A, abscess-cavity; B, embryonic cells at the periphery of abscess-cavity; C, occluded blood-vessels.

This has been the history of every case seen by the writer.

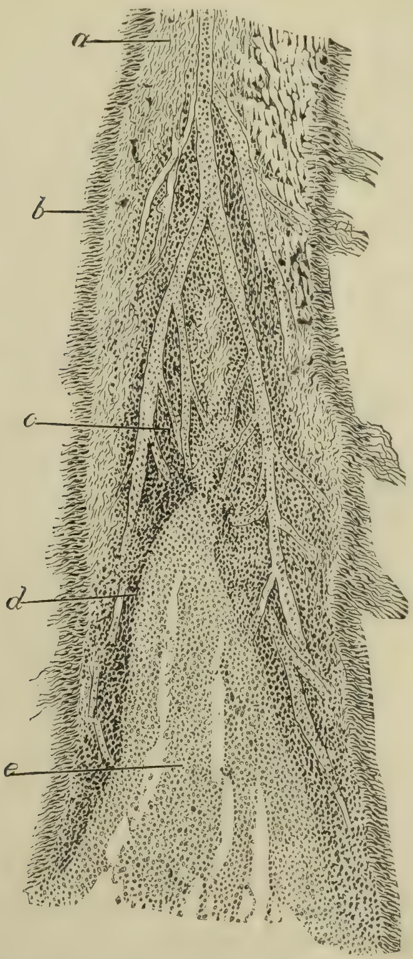
The pain in these cases is rarely referred to the proper tooth by the patient. In fact, there is usually combined with dental symptoms more or less reflected pain in the nature of a neuralgia of the fifth nerve. In the lower jaw, the pain is along the course of the auriculo-temporal nerve; in the upper, if a molar, commonly referred to the situation of Meckel's ganglion; an anterior tooth, to the point of emergence at the infra-orbital foramen; less commonly, the supra-orbital. The pain may, however, be located in any sensory branch.

Brunton, in Transactions of Odontological Society of Great Britain, records cases of trophic changes of the eye clearly due to the condition of dental abscess. Others, functional disturbance of eye and ear, disappearing with loss of the tooth.

In the latest stages there is more or less inflammation of the tissues of the apical space. The tooth responds now slightly to pressure. This subsides as soon as the pulp is entirely dead. The foramen is closed by scar-tissue of a weak type.

Diagnosis.—If the pulp be exposed, is self-evident. In a closed or apparently closed pulp-chamber, as follows: A tooth after filling has a history of exalted sensitivity. In the early stages, cold the more irritating. As the case progresses, response to heat gains the ascendency until at length cold brings relief.

FIG. 3.



Progressive suppuration of the pulp of an incisor. *a*, healthy tissue; *b*, odontoblast layer, or membrana eboris; *c*, inflamed tissue, in which the veins are seen to be dilated; *d*, line of demarcation of the suppurative process; *e*, pus.

A part of the crown portion of the pulp had been destroyed by suppuration, and in the remaining portion it will be noted how the pulp is hollowed out, the process pursuing the course of the veins and converging to the center (×100, reduced).

Any tooth giving such reaction and history to be viewed as the subject of abscess or necrosis of the pulp.

Prognosis.—Always bad for the vitality of the pulp; good, of course, for that of the tooth's future usefulness.

This question involves that of the subject of pulp-capping, its probabilities of success.

It has been stated that even in cases which have not given decided symptoms of inflammation there may be produced the minute aneurisms described. We know that many of the cases in which pulp-conservation through capping has been attempted have been the subjects of decided irritation, even pronounced congestion.

Any increased flow of blood to the pulp is necessarily followed by an increased difficulty of exit, as both classes of vessels enter the same foramen.

The minute veins, strained beyond their endurance, lose their elasticity and yield, forming these minute aneurisms. A return to normality is out of the question, while a certain amount of debilitated vitality may persist for an indefinite time; the loss of tonicity, resiliency of the blood-vessels, is enough to put past reasonable hope the formation of nature's protection, secondary dentine.

The pulp in this pathological condition is more liable to degenerative than to constructive changes.

Personally, I have found necessary the destruction of all pulps which have been the subject of decided congestion.

All tentative measures have resulted in the death of the organ, and it is preferable to attain this end by means of arsenic rather than abscess.

Teeth giving decided response to thermal change should have a non-conducting filling or lining. The history of decreasing response to cold in filled teeth means, in the majority of cases, not the quiet of health, but the somnolence leading to death.

Therapeutics.—Assured the existence of this condition, the pulp is to be removed. In some cases this may be accomplished at once without the aid of any medicinal measures. In others, a spray of ethyl chlorid may suffice. Should an application of arsenic be made, a thorough cleansing with hydrogen peroxid should precede it.

This condition is the middle ground of the question of immediate root-filling. This to be governed by the amount of decomposing organic matter present.

A filled tooth giving the reaction stated is to have the filling removed (rather the tooth opened), and the same course pursued.

These cases are frequently not seen until the pain produced through application of heat is severe, neuralgic; a condition where decomposition is in progress.

The same course to be followed, but a greater length of time for sterilization.

We can from the foregoing deduce a rational means of alleviating the suffering incident through pulpitis.

As the danger to the useful vitality of the organ lies in closure of the exit, through dilatation of the apical arteries and its consequent, the jugulation of the emergent veins, the indication is to lessen the volume of the fluid contents of the pulp, and the constriction of the arteries and arterioles.

This may be accomplished through the use of a glycerol of cocain. The glycerol being hygroscopic, it lessens the volume of the blood; the cocain, an anesthetic, acting perhaps by virtue of its production of arterial anæmia.

Whatever its specific analgesic action may be, the fact of its causing contraction of peripheral vessels is certain.

It is probably safe doctrine to assert that pulps which have been the subjects of decided congestion should be killed, not capped.

Certainly the records of the most careful operators I know correspond exactly with such a deduction.

THE RELATIVE MERITS OF FILLING-MATERIALS.

BY EDWIN T. DARBY, M.D., D.D.S., PHILADELPHIA, PA.

(Read before the Second District Dental Society of the State of New York, Jan. 8, 1894.)

MR. PRESIDENT AND GENTLEMEN:

I appear before you this evening, in response to the oft-repeated invitation of your worthy president, to discuss with you the relative merits of filling-materials. Had I known a few weeks earlier that one of your own members had but recently presented a paper upon a similar subject, I should have chosen another, or begged that I might be excused altogether. As it is, I must ask the courteous indulgence which I am sure you are ever ready to accord those who strive to present and are willing to receive the truth.

When the candidate for dental honors is asked to enumerate the essential qualities of a filling-material, he recites the formulated language of the text-books, which is: adaptability, impermeability, indestructibility, non-conductibility, absence of shrinkage, and harmony of color. Did any one material possess all of these qualities, there would be no occasion for the presentation of this paper, and the dental practitioner would be saved the necessity of that discrimination which he is almost daily called upon to exercise in the routine of his work. It is unfortunate that some of the materials possessing in such an eminent degree the qualifications desired are so deficient in others. Until the ideal material or combination of materials has been discovered, we are to a certain extent groping in the dark when we select, out of the many, the presumably best for a given case. May I therefore invite your attention for a few moments, while I endeavor to point out some of the good and bad qualities to be found in the materials and compounds now in general use?

That I may omit none, I will begin with the first recorded material, which was lead. It would seem that the French employed this material to a considerable extent in the latter part of the preceding century; and it must be admitted that lead possesses some desirable qualities, namely: softness or malleability, and relatively slight conductivity. But it is wanting in so many other qualities that it has gone into disuse. I remember to have seen, in the earlier years of my practice, in the mouth of a hunter, an inferior molar which had been filled upon its masticating surface with lead, and had done good service for several years. The man in whose mouth it was had prepared the cavity of decay and forced into it a large buckshot or small rifle-bullet, and had mashed it into the cavity by the pressure of the opposing teeth. Of course it was much discolored, and its softness would render it at best but temporary; and yet that one quality made it possible for the man to fill his own tooth, and therefore preserve it. Were there no other material than lead, with our present manipulative skill the teeth of the human race could be saved with lead.

But there are better materials than lead: and although it took dentists forty years to discover the valuable qualities of tin, it was, perhaps, worth all the delay; for I look upon tin as among the most valuable of our filling-materials. Consider for a moment how many of the essential qualities tin possesses. It has adaptability, impermeability, indestructibility; it is one of the best non-conductors among the metals; it does not shrink. But it is inharmonious in color. It is claimed by some that tin has antiseptic qualities, but of this I am not sure. Bear with me for a moment while I pay my humble but hearty tribute to this metal as a filling-material. My experience with tin covers a period of more than thirty years. I used it much when I began practice, because it was cheaper than gold, and at that time dental amalgams were poor. In the posterior teeth, when economy was to be considered, tin was the material selected, because it was the best; and although the preparations of tin then were not as good as now, I am satisfied that I did my patients valuable service, and saved many teeth with tin, better than I could have saved them with gold, and infinitely better than I could have done with the amalgams then in use. Who that has used tin to any considerable extent will not bear witness to the saving quality of this material? For softness and malleability it has no peer. It fits the cavity with as great accuracy as a ball of putty. It possesses cohesive qualities but little inferior to gold. It discolors upon the surface presented to the saliva; but who ever saw a tooth discolored from its use? Its non-conducting qualities are so good that it may be put in the most sensitive teeth without danger to the pulp. It is deficient in one quality, and that is hardness; hence it is not permanent upon masticating surfaces, unless capped with gold. Were I asked what I consider the best material for filling the teeth of children, the buccal surface of molars, and the cavities upon approximal surfaces which are sheltered from wear by mastication, I should say tin. But you tell me that it wears away and needs renewing. I admit that it has not the hardness of gold, nor will it wear as well when a large surface is presented to attrition; but it preserves the tooth until it is worn entirely out. I have seen fillings upon masticating surfaces dished until the bottom of the cavity was nearly exposed, and yet around the borders the tin keeping its place and preventing further decay.

I saw but recently, in the mouth of a lady perhaps eighteen years of age, some first permanent molars that Dr. S. G. Perry, of New York, had filled with tin at least ten years ago,—probably before the teeth were fully erupted,—and they were beautiful examples of the value of tin as a saving material. Tin may be worked in various forms. When the cohesive properties are to be relied upon, there is perhaps no better method than rolling the foil into a loose rope, and cutting into pieces of various lengths. In cavities surrounded by strong walls, the tin may be folded into tape or made into cylinders, and time will be saved in introducing it into the cavity. Shavings of tin turned from a revolving ingot of the metal in the lathe work with a softness which makes it a pleasure to use it.

When used in combination with gold, as suggested by the late Dr. Abbot, of Berlin, good results are obtained. When combining the two metals, my practice has been to fold one leaf of No. 4 tin between two leaves of No. 5 soft gold foil. Better results are obtained with this proportion of gold than when a less quantity is used. Shavings of tin, combined with Watts's crystal gold in about the proportions above indicated, work with a great degree of softness and malleability. Whether thus combining gold and tin has any beneficial result beyond an additional hardness of filling, I am unable to say. I have sometimes thought that it was not a desirable combination for approximal surfaces, especially at or near the cervical portion of the cavity. There is an electrical or chemical action brought about which often produces disintegration of the metals, not observable in fillings upon masticating surfaces made by the same combination. Were there no other material than tin, with our manipulative skill the teeth of the human race could be saved with tin.

Since 1815, gold has been used in America more extensively than has any other material, and it would seem to possess more of the desirable qualities than any other, and yet it is lacking in some.

While it possesses adaptability, indestructibility, and impermeability, it is inharmonious in color, and is one of the very worst non-conductors. It possesses many qualities superior to lead, and some superior to tin. It has stood the test of nearly a century, and in the hands of the skillful occupies the highest place among the many. But it is not *always* best. It is not best because it is numbered among the noble metals, and costs thirty dollars per ounce, instead of fifty cents per pound. It is not best in the teeth of the young. It is not best in soft teeth with weak cavity-walls. It is not best in deep cavities where thermal changes are liable to affect the pulp. It is not best in the hands of the mediocre in talent and attainments. Thousands of men have this day been endeavoring to save teeth with gold which they would have saved much better had they used other materials. It is best just in proportion as it is used with discrimination and skill. I have sometimes thought that the improvements which have been made in cohesive gold and in our mechanical appliances, all of which enable us to do with ease that which was formerly done with difficulty, have often tempted us to undertake more with gold than is always wise or judicious. I am strongly of the opinion that more pulps are sacrificed upon the altar of cohesive foil than were ever dreamed of when soft gold and hand-pressure were used exclusively. Just in proportion as our gold fillings are large and solid, just in that proportion are they dangerous to the life of the pulp. I would not be considered an advocate of soft gold to the exclusion of cohesive, for I use and teach the use of both ; but I believe better results would be attained if many who are wedded to cohesive gold would use a larger proportion of soft gold in all cavities not requiring great retaining hold. With your permission, I will detail to you a method of using soft gold which I have practiced for more than twenty years, and with such pleasing results that I have no desire to discontinue its use. A leaf of Abbey's "old-fashioned" soft foil No. 5, or Morgan & Hastings' soft foil, the same number, is cut into thirds. It is then folded into a tape about one-eighth inch wide. This is heated in the flame of the lamp or Bunsen burner,—not to make it cohesive, for it does not do that, but to make it tough. Treated in this way, it works more like a good article of tin foil than anything else. The bulk of all cavities which have strong walls are filled by me with foil thus prepared. As I approach the surface of the filling, No. 20 extra-cohesive foil, or Watts's crystal gold, is used, and a hard surface is obtained. Fillings of great density may be made with cohesive foil; but density is not more essential than perfect adaptation, and with foil worked as I have described this quality is obtained.

With all its faults, gold fulfills in a larger degree than any other material the desires of the skillful and conscientious dentist. Used by him with discrimination, and not to the exclusion of other at times better materials, it will hold its high place in dental practice.

When the Crawcours came to America in 1833, bringing with them the silver paste of Taveau,—or, as they called it, the "Royal Mineral Succedaneum,"—the dentists of that day looked upon it as a black curse; and I am sure, if we had no better amalgam than the silver filings and mercury with which they sought to build a reputation, we, too, would shrink from amalgam, as the better dentists of our country did then.

In 1848, Dr. Thomas W. Evans, of Paris, introduced his amalgam, which was composed of pure tin, cadmium, and mercury; but it was soon found that cadmium was one of the very worst metals that could be used in a dental alloy, and its use was soon discontinued. In 1855, Dr. Elisha Townsend, of Philadelphia, advocated an amalgam of four parts silver and five parts tin, which was superior to any which had preceded it, but much inferior to many which have followed it. It was not until 1868 or 1870 that any important improvements were made in dental alloys. The experiments of Fletcher and Hitchcock and Tomes, of Walker and Lawrence and Holmes, of Dawson and Shattuck and Welch, of Flagg and Bonwill and Hammond, and many others whose names do not appear as proprietors of dental amalgams, have done much to perfect a class of filling-materials which we recognize as useful and valuable. The prejudice against amalgam is decreasing day by day, just in proportion to the improvements which are being made in the character of the alloys.

Contrast for a moment the better class of our white alloys of the present day with the filings of silver coin and mercury which were used forty years ago. But some one will tell me that all of these alloys contain mercury, and are therefore detrimental to the health. To such a one I would say, Give me proof positive that amalgam fillings have in any way proved injurious, and I will discontinue their use. I have the profoundest respect for the opinions of my fellow-men, and I cannot but think that the men who have always abstained from the use of dental amalgams have done so from conscientious convictions, and I respect them for being thus consistent; but, on the other hand, there are thousands of men, not less conscientious, who believe that they can save teeth better with amalgam than with gold, and they employ it, not because it is cheaper or less laborious, but because they can do with it that which they could not do with gold. For such men I also have the profoundest respect.

Laying aside for the moment all theories, and dealing only with practical results (and this paper is intended as intensely practical), what are the facts in regard to amalgam as a filling-material?

The makers of modern alloys, almost without exception, claim three distinct points of excellence. First, they will not shrink in hardening; second, they will not expand; third, they will not discolor. As proof of the first two, they submit the test experiment of Fletcher, which is the glass tube and the aniline blue, the polished hole in the bar of steel, as suggested by Tomes, and the V-shaped steel trough of Hitchcock. For the third claim, they have no experiment but that of use in the mouth.

It is true that most alloys composed of silver, tin, gold, and platinum or zinc do not show indications of either contraction or expansion when the experiments are made out of the mouth ; but how often we see amalgam fillings in the mouth that have the appearance of having been pushed slightly out of the cavity. Especially is this true of large compound fillings.

Again, how frequently we see this same class of fillings which have the appearance of having contracted, leaving a slight space between the metal and the walls of the tooth. A little of the same mixing put into the glass tube and covered with aniline blue would probably show no similar change.

Again, the same alloy, manipulated in the same way, does not always present the same appearance in the mouth. In one instance it produces a perfect filling, and we are pleased with it ; in another instance, where the conditions are apparently the same, it produces an imperfect filling, and we are displeased with it. It is just this variability in the results obtained with any or all of these alloys that at times causes discouragement and chagrin. We have all doubtless seen alloy fillings of our own, or from the hands of others, which have fulfilled in the highest degree the desirable qualities to be sought for in a filling-material ; and we have also seen in the mouths of our patients, or in the mouths of other men's patients, results which make us blush at our own, and pity the lack of skill shown by our brother.

It is this lack of uniformity as to result that leads us so often to say that the more we see of amalgam the better we like gold.

Were all cavities to be filled situated upon masticating surfaces, and surrounded by strong walls, and prepared with the same care that is usually bestowed upon cavities for gold, and then filled with almost any of the better class of alloys in the market at the present time, and, after hardening, smoothed and polished as gold fillings are, there would be little doubt about the saving quality of amalgam.

A combination of gold and amalgam in the same cavity, or brought in contact in the same tooth, is often attended with the most pleasing results. Thirty years ago such a combination would have been thought bad practice ; but we have learned some wisdom in thirty years, and, among other things, we have learned that if we do the opposite from what we were then taught we obtain the best results. We have all observed, doubtless, that where a large amalgam filling has been placed upon an approximal surface and allowed to come in contact with a gold filling upon the masticating surface, the amalgam has turned quite black, but the margins have been clean cut, with none of that bulging from the walls of the cavity to which I have alluded.

Some years ago Dr. Register, of Philadelphia, suggested the idea of filling large cavities on approximal surfaces two-thirds full of amalgam, and while the material was yet soft working into it gold foil, and completing the last third of the filling with gold. In places where a matrix can be used, and the amalgam confined, excellent fillings can be made. Watts's crystal gold, or the crystal mat gold, can be used for this purpose, and as it absorbs the mercury more readily than foil, I prefer it. Of course, discoloration of the alloy must be expected; but in hidden places or in posterior cavities this is not a serious objection to its use.

The dental profession of America has experienced such disappointment in the use of copper amalgam, that I dare hardly mention it as among the filling-materials of the future. While I have shared that disappointment in a measure, I cannot feel that keen sense of *remorse* which some confess. I do not regret having experimented with it, for I have learned some things which could only be known by experience. Copper amalgam is both good and bad. It is good just in proportion as it turns black and remains so; it is bad just in proportion as it assumes that steel-gray color and retains it. The only proper places for it are masticating buccal and lingual surfaces of vital teeth; in such places it has often done good service for a number of years. I have found that by combining about one-fourth part of a good gold and platinum alloy with it, better results are obtained.

Palladium amalgam makes a filling of superior quality; but it sets with such great rapidity that there is little comfort derived from its use, and it has the objection of intense blackness, resembling charcoal or ebony.

The non-metallic plastic filling-materials which are worthy of our consideration are but three in number,—gutta-percha, oxychlorid of zinc, and the oxyphosphates.

When, in 1849, Dr. Hill introduced the stopping which bears his name, great hopes were entertained that it would take the place of gold; but it was soon found that it did not make a permanent filling. Soon after its introduction it was followed by the Bevens stopping, which was superior to anything which had preceded it, and, in my opinion, greatly superior to anything that has ever been known since that day. The formula was never divulged, and the inventor died a few years after he had introduced it. This material possessed qualities that I have never seen in any other preparation in which gutta-percha formed a part. It became exceedingly hard after it had been in the mouth a short time; and when an attempt was made to remove it, it was found to resemble horn, or rubber that had been vulcanized.

Most of the preparations of gutta-percha offered for sale contain oxid of zinc, lime, silex, or feldspar, and are quite variable in their lasting quality. They are best adapted to buccal surfaces, and will preserve the teeth if watched with care and renewed when worn away. They cannot be numbered among the so-called permanent fillings.

The oxychlorids were introduced in 1856, by Sorel, of Paris, and were first used for stucco work. As a filling-material for teeth the preparation did not fulfill the high claims which were made for it; but it occupies a worthy place in dental practice. I look upon it as the most valuable material for capping exposed pulps, and as the best filling for root-canals. It possesses an antiseptic quality, the value of which is often overlooked when choosing a material for the canals of teeth. The difficulties which some experience in introducing it into the canals of superior teeth would be largely overcome if a shred of cotton or floss silk were used upon the broach.

The combination of oxid of zinc and glacial phosphoric acid, and known under a score of names, is worthy of more than passing notice.

These preparations are not all good, but some of them are exceedingly valuable. The German chemists seem to have produced better preparations than are made on this side of the Atlantic. Those which have been most satisfactory in my hands are Eisfelder's, Poulson's, Worff's, and what is known as Harvard cement. A little more trouble is experienced in working Poulson's and Worff's, because the phosphoric acid is in crystalline form, and must be melted before it is combined with the powder; but the result obtained more than compensates for the additional labor in preparation.

I am using all of these in my own practice; and they have proven so much superior to those made in this country, that I rarely try any but those of German make. But, you naturally ask, do they make permanent fillings? To which I would reply, No. They are exceedingly variable in their durability. Upon masticating surfaces with normal secretions, they will last from two to five years, and save the tooth as perfectly as any material could. They will often do as wel upon approximal surfaces, but their reliability is less certain. They should never be inserted at or near gum-margins; but if gutta-percha is used near the gum, and one of the better preparations of this material used in the remainder of the cavity, and carefully watched by frequent addition to them as they wear away, they prove of great value in the teeth of the young, and in teeth of poor structure. If manipulated with that care which they are worthy of receiving, and used in such places as have been indicated, they fulfill in an eminent degree the qualifications of a good filling-material.

The ideal filling has not yet been discovered; but it will surely come, and it lies along these lines.

There is no better field for the dental chemist to labor in than this. He may come upon it as by accident, or it may require months or years of patient experimentation, or it may come to him in dreamy visions of the night, as an inspiration,—it matters not how; but when he shall have combined in a plastic material adaptability, impermeability, indestructibility, non-conductibility, absence of shrinkage, and harmony of color, then shall his name be engraved upon the pinnacle of fame, and the dental profession throughout the world will rise as one man and call him blessed

Finally, gentlemen, I have said but little that is new, and possibly nothing that is valuable. If I have confirmed some brother in his faith, or helped to make more easy the burden of a fellow-pilgrim in the highway of life, I have done well; and, after all, that is the truest success to which man can aspire.

ON COAGULANTS IN THE TREATMENT OF THE PULP-CHAMBER AND CANALS.

BY EDWARD C. KIRK, D.D.S., PHILADELPHIA, PA.

(Read before the joint meeting of the First and Second District Dental Societies of the State of New York, February 12, 1894.)

READERS of periodical dental literature will have observed, during the past few years, statements by writers and speakers upon dental therapeutics to the effect that medicaments which possess the property of forming a coagulum with albuminous organic matter should be excluded from the treatment of pulpless teeth. Such statements are made with growing frequency, quite regardless of the excellent clinical record made by coagulant antiseptics, and especially since the able researches of Professor Miller and Professor G. V. Black have thrown so much light upon the antiseptic value of a number of substances which are devoid of the coagulating property, and which it has been proposed to utilize instead of coagulants in pulp-canal treatment.

The objection which is made to the use of coagulants by those who condemn them in this connection is, as nearly as I have been able to ascertain, based upon the assumption—for I regard it as such—that when introduced into a pulp-chamber their action is to superficially seal the dentinal tubuli by forming an impenetrable coagulum with the orificial end of their albuminoid contents. This is believed to produce the two-fold result of preventing the further entrance of the coagulant or any other antiseptic, and also of hermetically inclosing within the tubular structure of the dentine a certain quantity of non-sterilized or infected organic matter, which may by its decomposition act subsequently as an irritant to the pericemental membrane. If the major premise of this assumption be a correct statement of the actual conditions, then we must admit the corollaries as deduced from it; but in so doing we necessarily admit that our best-known and most generally used antiseptics in the treatment of pulp-canals—viz, carbolic acid, zinc chlorid, and corrosive sublimate—do not penetrate the dentine structure, and consequently sterilize only a superficial film of organic matter lining the pulp-chamber and canals. The long clinical record in favor of the substances named would seem to indicate that their action in the pulp-canal is something more than a superficial action, and that their penetrating power is not self-limited because of the coagulating property which is common to each. It is my purpose to call attention to what I believe to be a serious error in this reasoning, which has led to the somewhat general condemnation of coagulants in pulp-canal treatment, and to present the basis for my belief that the coagulating property is not *per se* a sufficient reason for their disuse; or, stated otherwise, if they are unsuited for the purpose of pulp-canal treatment, it must be for other reasons than that they are coagulants. The popular objection to the use of coagulant antiseptics is fairly stated by Dr. A. W. Harlan, who, so far as I can learn, appears to have been the originator, or at least the chief exponent, of the assumption. He says in his report as chairman of Section V of the American Dental Association, in 1889 (*vide* Transactions), referring to Professor G. V. Black's paper on Antiseptics,* "The above paper practically opened up the subject of the value in dental practice of the agents which, with a few minor exceptions, may be classed as non-coagulants. . . . The experiments above referred to, in fact, refute the idea that coagulants are necessary to accomplish the destruction of microbes. It is not denied here that coagulants are useful medicaments in dental practice, but we maintain that in the treatment of pulpless teeth for purposes of disinfection they are not only useless but detrimental; *in fact, their use defeats the object sought to be obtained. They coagulate the organic surface*

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* *Dental Review*, 1889, page 128.

with which they come in contact, and prevent their own diffusion. A diffusible disinfectant is constant and ever-acting. One that coagulates, cooks, or destroys is not indicated in this line of practice.''

In the discussion which followed the reading of this report, Dr. Wm. H. Atkinson made the following significant remarks: ''We must go a little deeper, and nominate the changes that occur between the food-product and the chemical product,—that is, the result of the changes made by bringing the various substances together. There are affinities resident in the primal elements that have to be satisfied, to bring about the changes we have recognized. We have not recognized the true theory so as to get at the alphabet of the molecular changes when we are considering the results as we deal with diseased tissue.''

Again, in discussion of a paper by Dr. Harlan, read before the American Dental Association in 1887, entitled ''A Note on the Value of Resorcin in checking the Production of Pus around the Roots of Teeth,'' Dr. Atkinson said, ''He (the author) asserts dogmatically that anything that will coagulate albumen is not fit to be used in the treatment of the root-canal. . . . Chlorid of zinc has repeatedly been introduced to preserve exposed pulps, that has converted the entire pulp throughout the length of the canal into a hyaline coagulum that has proved just as good a filling as can be, and has stood from year to year and without coloring the teeth or giving any indication of any retrogressive movement whatever.'' At the same meeting Professor James Truman said, in speaking of the necessity for sterilizing and rendering inert the organic matter present in the tubuli of pulpless teeth to prevent subsequent discoloration of the tooth and pericemental irritation, ''My study of the subject and the result of much experimentation led me to the conclusion that it was essential to prevent this decomposition, and that this could be accomplished by coagulating the organic tissue. The coagulant best adapted for this purpose is chlorid of zinc, because of its great affinity for water. It will follow moisture to the very extremities of the tubulated structure, and consequently change the character of its contents so that decomposition will not take place. I have kept albumen under chlorid of zinc for months out of the mouth without destructive change occurring, and therefore I have reason to infer that it will prevent its taking place in the tooth.

''I have gone to considerable trouble in endeavoring to demonstrate that chlorid of zinc passes into the tooth, and I had intended to read a paper before this society on the subject, but the examinations were not complete, so that I cannot say that I have absolutely proved it, but can only reason theoretically that it must pass into it.''

The official report of the proceedings does not show that Dr. Harlan made the dogmatic assertion attributed to him at that meeting by Dr. Atkinson, but in the *Dental Review* for 1889, page 44, in a paper upon ''Escharotics and Coagulants,'' he states as follows: ''Coagulators of albumen must be kept out of pulpless teeth. No necessity exists for their use in pulpless teeth. Coagulation always prevents diffusion of vapors and vaporizable substances.'' Earlier in the same paper he says, ''A coagulum is, however, an effectual barrier to the immediate penetration of medicaments in roots of teeth for the purpose of disinfection, and should not be produced.'' That the effect of this teaching has been to gain numbers of advocates is apparent to all who are readers of dental literature. Two instances will serve to show that the idea has taken root and flourished among those who are striving for the best results in the therapeusis of pulpless teeth. In a paper on "Treatment of Teeth having Foul Pulps," by A. Retter, D.D.S., Utica, N. Y.,* the author says, in his otherwise practical and valuable paper, after recommending the use of a saponifying agent—*e.g.*, sodium carbonate or ammonia—as a preliminary treatment of infected pulp-canals, "No substance which has the power to coagulate albumen should be used at this stage, for such action prevents the ingress or penetration of a germicide, as well as the escape of septic matter and its gases. A tooth may become well by their use at this stage of treatment, but it does it in spite of such unreasonable treatment, and not on account of it." He says further, in closing, "The after-success and comfort of teeth thus treated depends largely upon the care and choice with which the roots shall be filled. Up to this stage I have avoided, as much as possible, anything that might clog or close up the tubuli. Now I desire a material that will go to the end and soak into the tubuli as much as possible, and for this purpose I prefer two agents. The first is oxychlorid of zinc,—provided the canal is large enough to permit of its successful working. This material, from its affinity for moisture, will penetrate deeply and persistently into the tubuli, coagulating whatever tissue may be in them, and rendering them non-decomposable." It should be noted in this connection that whatever of coagulating power is possessed by this compound is to be attributed to the action of the free zinc chlorid, before combination has taken place with the oxid of zinc to form the oxychlorid, as the resulting cement is devoid of coagulating power. His other favorite preparation for this purpose is an alcoholic solution of shellac containing hydronaphthol.

In a paper on "Conservative Treatment of the Dental Pulp," by Dr. Arthur C. Hugenschmidt, of Paris, France, read before the Southern Dental Association,† he says, "When we apply a coagulating antiseptic, we of course set a barrier to the further action of the remedy, as has been repeatedly and correctly stated by our confrère, Dr. Harlan, in reference to the use of coagulating antiseptics for the treatment of dead teeth."

It is evident, then, that the question with which we have to deal at present is simply as follows: Do coagulant antiseptics produce with albuminous matter a coagulum which is a barrier to the further diffusion of the coagulant or other medicaments? Or, as has been asserted, are coagulants self-limiting in their action? An equally important subject for consideration is the question of the antiseptic value of the coagulum so formed, but this is apart from the immediate question at issue, though I hope to be able to present the results of some experiments upon this subject in a future communication.

If the assumption be correct that coagulants seal up the orifices of the dentinal tubuli with an impenetrable coagulum, and are therefore self-limiting in their action, it would seem that we are confronted in this case with a definite exception to the well-established laws of diffusion known as osmosis. I hope to be able to show, before concluding this paper, that such is not the case, and that the assumption as noted is based either upon faulty reasoning or insufficient data. I shall also endeavor to demonstrate that coagula are not necessarily barriers to diffusible antiseptics, that the uncompromising physical forces of osmosis or capillarity are operative in the case of coagula, and that diffusion of liquids will take place through,—nay, even by means of such septa.

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* DENTAL COSMOS, 1889, page 933.

† Ibid., 1890, page 720.

I am well aware of the difference of opinion on this point among some of the profession, but I am inclined to believe that those who advocate the abandonment of these valuable agents are in a small minority, and that their views are largely influenced by the faulty assumption which I have noted.

The use of coagulants such as carbolic acid, zinc chlorid, sublimate, etc., has not only overwhelming clinical evidence in its favor, as most of you can no doubt testify, but it is actually proper on theoretical grounds, and fully in harmony with the laws of osmosis. I do not wish to be understood as favoring the indiscriminate use of these substances, for they possess individual characteristic properties and effects which may rightfully exclude their usage under certain conditions. What I wish to emphasize is that their coagulating property cannot be scientifically or clinically urged as an objection against their proper use.

As the laws of osmotic action are those which will explain the phenomena with which we are at present dealing, I wish to ask your attention for a few moments to a hasty glance at that subject.

The observed natural tendency of all fluids, whether liquid or gaseous, to diffuse, interpenetrate, or mix with one another, is called diffusion. It is a natural tendency dependent upon molecular attraction, and takes place without mechanical action and in apparent disregard of the force of gravitation. It is based upon a well-established force termed capillary attraction, or adhesion where the surfaces of different kinds of molecules of matter cling or adhere together. When such diffusion of liquids, however, takes place by means of or through a membrane, it is called osmosis. Both diffusion and osmosis take place in accordance with well-defined physical laws, whose formulation is the outcome of numerous experiments and careful observation by men of different eras and climes. Such names as Abbé Nollet, 1748; Parrot, 1802; Sœmmering and Van Mons, 1812; Lebkuechner, 1813; Majendie, 1820; Fischer, of Breslau, 1822; the brilliant French physicist, Dutrochet, 1837; and finally, Professor Graham, of England, have been among the most prominent investigators of osmotic phenomena.

The space usually allotted to a paper of this character will not admit of more than brief mention of the general result of their work, which was as careful and ingenious as it was varied, and led to but one resulting generalization,—viz, that capillary attraction, so called, is the fundamental principle underlying all phenomena of diffusion or osmosis. Whether it be the absorption of nutrient pabulum in our bodies, the suction of sap from the earth by flower or plant, the gathering of clouds overhead, or, as I hope to show, the penetration of coagulant antiseptics in the treatment of pulpless teeth, the same force of adhesion or capillary attraction is the basis of the phenomena. There is no essential difference between penetration or diffusion *in* or *out* of the body, between the so-called vital or the physical. This point seems to be definitely settled. The main conditions favorable to osmosis, briefly stated, are :

1. That the substances to osmose be crystallizable and readily soluble. If they are amorphous (colloid) and insoluble, they will not penetrate the membrane.
2. Since substances have to pass through the membrane in order to meet each other, the membrane itself must be capable of imbibition, of being wetted by both solutions ; in other words, of taking them up into its substance.
3. Both liquids must be miscible with each other. If they are not, diffusion cannot take place.
4. They must be of different densities or dissimilar in kind.

This much for general diffusibility of liquids. The *rate* of diffusion depends upon additional factors, since it is well known that membranes do not imbibe all solutions with the same degree of activity. Liebig has shown that distilled water is always taken up in greatest quantity, and that crystallizable solutions enter membranes in an inverse ratio to their density. The greater the density, provided it does not exceed a certain percentage, the stronger will the current toward itself be (endosmosis). Weaker solutions diffuse more rapidly toward strong than *vice versa.* Albumen is the most powerful producer of endosmosis, hence it is that it plays such an important part in absorption in the human system. Heat, slight elevation of temperature, is another factor in rapid osmosis, as are the variations in density, pressure, affinity, and nature of liquids to be diffused.

For gases, the law is more uniform, namely : That they diffuse in inverse ratio to the square root of their density. But how do coagulants, crystalloid agents that coagulate albumen or the albuminous constituents of the permeable membrane act?

Mialhe has shown,* as I propose to show to-night, that these substances, although somewhat slowly, are nevertheless taken up by and diffused through membranes. He has likewise shown that they are also taken up by blood-vessels. We have in the three substances mentioned at the beginning of this paper—viz, chlorid of zinc, carbolic acid, and sublimate—typical coagulant antiseptics, whose properties are quite familiar to all of you. If a test-tube containing a strong solution of zinc chlorid, say to one-fourth or one-third of its depth, have carefully added to it, so as not to agitate the surface of the zinc solution, an equal bulk of fresh egg-albumen, we will observe at the contact point of the two liquids the formation of a dense white opaque film, which is the coagulum formed by the union of the two substances. Observe at this point that we have at once fulfilled all the conditions needful for osmosis. We have the crystalloid zinc solution, the colloid albumen, and the membrane consisting of the coagulum separating these two liquids of unequal density, both with strong affinity for each other and both capable of wetting or penetrating the membrane. We are therefore justified in expecting osmosis to take place, and from what we already know of the power of albumen to induce endosmosis—that is, osmosis toward and into itself—we should naturally expect the coagulum to proceed throughout the entire extent of the albumen column. This, as a matter of fact, it does in a comparatively short time, and if we have been careful to previously mark the original level of zinc solution, which will indicate the surface of the first contact of the two liquids, we will find at the close of this experiment, when the albumen has completely solidified, that the level is exactly as it was originally, showing that the result has been brought about by osmotic action regardless of gravitation, and is not produced by a mere mechanical mixing of the liquids. It shows incontestably what is more to our purpose, that the assertion that "coagulants defeat the object sought to be attained, by coagulating the organic surface with which they come in contact, and prevent their own diffusion," is an error simply because it is not in accordance with the facts. The experiment just noted has been carried out with sublimate and with carbolic acid respectively, with exactly similar results so far as the osmotic feature is concerned, the only difference being in the relative rates of penetration or diffusion of the coagulants into the albumen.

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* "Chimie Appliquée a la Physiologie," Paris, 1856, p. 200.

Miller states* that "bichlorid of mercury in powder applied to the end of a pulp one and one-half inches in length [taken from the first molar of a calf] permeated the whole pulp within forty-eight hours, converting it into a stiff gray mass. Such pulps removed from the tubes at any time from two days to eight weeks were completely preserved, without a trace of smell or any sign of decomposition. In no case did any development take place around the pulps when they were placed on nutritive agar-agar; not only that, but the pulps themselves showed a powerful antiseptic action." He states further† that "teeth subjected to the action of concentrated carbolic acid for one and three-quarter hours were not sterilized throughout." This does not necessarily prove that the carbolic acid has not penetrated the tooth, for it may mean that the antiseptic power of the carbolic acid is reduced or annihilated by the albuminous matter of the dentine-matrix or tubular contents with which it has formed a coagulum. He says,‡ with respect to this, and I fully accord with his views: "Some substances act only in virtue of their own dissolution, and in the same degree as they act they lose the power to act further, and eventually become completely inert. Peroxid of hydrogen is a well-known example of this class. It cannot act without giving up its extra atom of oxygen, and in doing so it becomes simply water, an inert substance. Now, without having made a thorough study of this question, I am convinced that a similar loss of power is suffered by nearly all, if not all, antiseptics in the course of time. I have found that threads of cotton saturated with concentrated carbolic acid and brought into root-canals, some months or even weeks later had completely lost their antiseptic action; particularly was this the case where there was a large open foramen."

This quantitative relationship which must exist between the antiseptic used and the infectious material is a necessary deduction from the fact that the acts of sterilization and disinfection involve chemical reactions which produce new compounds, and all such must take place in definite proportions by weight, in accordance with well-known chemical laws. This question I have presented elsewhere.*

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* DENTAL COSMOS, August, 1890.
† Ibid., May, 1891.
‡ Ibid., August, 1890.

Miller's experiments on the penetrative character of antiseptics for treatment of carious dentine gave results expressed in terms of their relative sterilizing power, which gave first place to sublimate, followed by zinc chlorid and carbolic acid. These latter two gave different results, depending upon the method of experimentation. In my tube experiments with egg-albumen the rate of penetration is greatly in favor of zinc chlorid over carbolic acid.

With respect to carbolic acid, Dr. Harlan says,† "It coagulates the surface of the animal matrix of the tooth, rendering it necessary to cut away the surface before filling is attempted, if we desire to preserve the color of the crown of the tooth. It is self-limiting in a hard structure, and is not diffusible." This statement he makes, unsupported by any record of experiment to demonstrate its accuracy, which I strongly question. With respect to its action upon pulp-tissue, Miller says,‡ "Carbolic acid gave results so similar to those obtained with trichlorphenol that they need not be especially described. Its action appears, on the whole, not quite as powerful as that of trichlorphenol." And of trichlorphenol, "It possesses the property of penetrating pulp-tissue very rapidly, thoroughly hardening it, and imparting to it a beautiful pink to red color. It also exerts a powerful antiseptic action, so that in its pulp-preserving property I think I may put it by the side of the sulfate of copper, although carbolic acid, chlorid of zinc, and oil of cinnamon will compete with it for the place." Of zinc chlorid he says, "Chlorid of zinc penetrates the tissue quite as rapidly, and in some cases it has appeared even more rapidly than sublimate. Applied on cotton to the end of a pulp one and a half inches long, it will permeate the whole pulp in forty-eight hours, converting it into a grayish-white stiff body.

"Such pulps transferred to the agar-agar plates very seldom showed any development of bacteria, except at the extreme point.

"The antiseptic power of the chlorid of zinc is, however, known to be inferior to that of many other available antiseptics, so that, on the whole, I am not yet sure where this agent should be placed on the list; this will be determined by further experiments. It certainly has thus far produced a favorable impression."

These statements are presented as evidence deduced from careful experimentation, to show that none of the coagulant antiseptics which we are considering are self-limiting in their action, so far as egg-albumen or the soft tissues are concerned. That there is a marked difference in their relative power of penetration is evident, but it is equally evident that they are amenable to the forces of osmosis, and permeate tissue in accordance therewith.

Now, with respect to the possibility of their osmosis in the dentine structure. To settle this matter the following experiments were undertaken: Recently extracted, sound teeth, which had been preserved in a dilute solution of boroglycerid, were opened from the masticating surface, or in the case of incisors, from the lingual surface, with a drill, and communication thus established with the pulp-chamber, care being taken to disturb the pulp as slightly as possible. The aperture of entrance was enlarged and made conical, with the base of the cone away from the pulp-chamber, and into this was fitted with cement a glass tube with its end drawn down to a funnel or cone shape, so that it fitted into the cone-shaped aperture of the tooth as accurately as possible. The apical foramina of all of the roots so prepared were closed by dipping the root-ends into melted Canada balsam. By this arrangement a funnel-like tube in direct water-tight communication with the pulp-chamber was secured. In the experiments of this character thus far carried out, my observations have been confined to zinc chlorid and sublimate. Into a number of the teeth thus fitted with tubes a saturated solution of zinc chlorid was poured, and similarly in others sublimate in saturated solution was used. Those containing the zinc salt were immersed up to the anatomical neck of the tooth in egg-albumen contained in test-tubes. The funnel-tube attached to the tooth was passed tightly through a cork, and this arrangement maintained the tooth at the determined depth in the albumen. It is now evident that if the coagulant antiseptic, zinc chlorid, is self-limiting in its action, and sets up an impenetrable barrier to its own diffusion, none of it can possibly pass through the root-walls by osmotic action.

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* Dental Cosmos, November, 1891, page 1033.

† "Synthetic Carbolic Acid." Transactions Joint Meeting of the American and Southern Dental Associations, 1890.

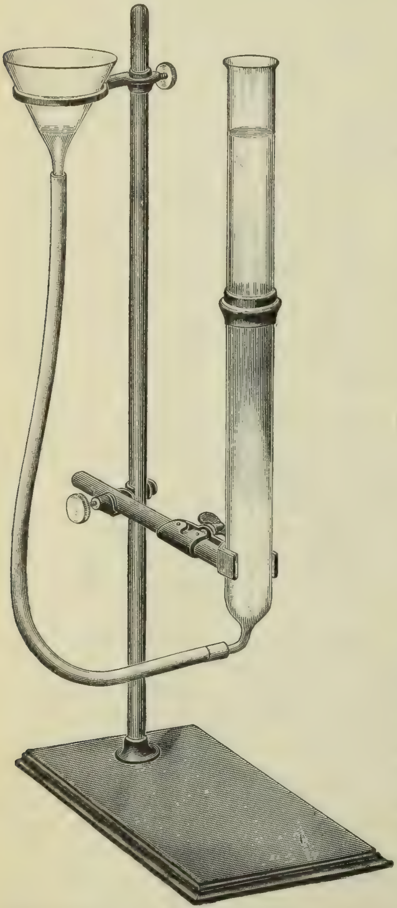
‡ Dental Cosmos, August, 1890.

On the contrary, if this be an error, then in the course of time the zinc salt will find its way through the structure of the root and manifest its exit by coagulating the albumen surrounding the root. In these experiments, after twenty-four hours there was evidence of the forming of coagulum upon the outer surface of the root, and two days later the coagulum had spread so as to come in contact with the walls of the containing test-tube and completely envelop the root throughout its entire length.

From this we may infer that zinc chlorid is not a self-limiting coagulant when applied to the hard structure of the tooth-root. The tests with sublimate were arranged somewhat differently with respect to the end reaction, to demonstrate the exit of the sublimate through the root-walls. Instead of immersing the roots in albumen, this phase of the experiment was varied by using a solution of potassium iodid, to which mercuric chlorid was previously added until the precipitate of mercuric iodid was no longer redissolved ; the solution was then filtered clear. It is evident that the slightest addition of mercuric chlorid to such a solution will be made manifest by the production of the characteristic red precipitate of mercuric iodid. Teeth prepared as for the zinc chlorid test, filled with a saturated solution of sublimate and immersed to the anatomical neck in the iodid solution, showed the characteristic color reaction in three days. Therefore corrosive sublimate is not a self-limiting coagulant when applied to the hard structure of the tooth.

Similar experiments upon the penetrative power of carbolic acid are still in progress, and though they are not sufficiently completed to form the basis of a report, I think I have enough evidence to show that this substance follows the general laws of osmosis as do the other crystallizable coagulant antiseptics, though the rate of penetration is much slower.

We have seen thus far that these substances do not oppose a self-constituted barrier to their own diffusion through tissue, albumen, or dentine. It remains, however, to inquire whether the coagula formed by them will permit the passage of other antiseptics,—*i.e.*, whether coagula as septa will support or induce osmosis as do other membranes. To test this question a special apparatus was devised which would furnish ocular evidence as to the fact of osmosis through coagula if such action occurred. A test-tube one inch in diameter, eight inches in length, and having an inlet-tube at its base, was supported vertically, mouth upwards, to a retort stand by means of a suitable clamp. A small funnel held by a ring-clamp to the same support was connected to the inlet-tube of the test-tube by a length of rubber tubing. A saturated solution of sublimate was then cautiously poured in at the funnel until the solution rose slightly above the level of the open mouth of the vertical test-tube, forming a convex surface to the liquid. Upon this surface was carefully placed by a sliding motion a coagulum of zinc chlorid and albumen, approximately three mm. thick, which had been previously obtained by pouring egg-albumen upon the surface of a saturated solution of zinc chlorid in a flat dish, and afterward carefully washing the coagulum with distilled water. The edge of the coagulum when in position was trimmed with a sharp knife to correspond with the edge of the test-tube flange, in the same way that a cook trims the edge of a pie-cover to the edge of a pie-plate. On top of this diaphragm of zinc-chlorid coagulum another test-tube of the same dimensions, with the bottom blown out, was placed mouth downward, and the joint completed and made perfectly tight by wrapping with a half-inch strip of rubber-dam, which was carefully tied in place on each tube and subsequently varnished with asphaltum varnish. As soon as the joint was perfected, a quantity of the potassium-iodid solution before referred to was poured into the tube above the coagulum diaphragm, and the funnel was simultaneously raised to a point which brought the surface of the liquids in the two arms of the apparatus to the same level. This was done that the pressure on both sides of the diaphragm should be equal. It is now evident that the only means of communication possible between the two



Osmometer arranged to show Diffusion of Coagulant Antiseptics.

liquids must be through the coagulum ; also, if such a communication should take place it would be made evident by the formation of the characteristic mercuric iodid. In less than two hours the reaction had occurred, the precipitate forming in the upper tube containing iodid solution. The same experiment was repeated with the liquids reversed, and the precipitate was again formed, this time in the lower tube, which now contained the iodid solution.

Further experiments with the osmometer were tried, using the same solutions, but varying the conditions by the introduction of different membranes,—bladder, stomach, blood-vessels, etc.,—coagulated by zinc chlorid, sublimate, and carbolic acid, also with membranes untreated and under varying conditions of temperature and pressure, with the common result that in each instance penetration and osmosis readily took place.

From which I infer that coagulant antiseptics are not self-limiting barriers to the diffusion of antiseptics other than themselves, when the conditions necessary to osmosis are fulfilled. The subject is a very broad one, and difficult to treat even superficially within the limits of a paper of this character. There is a large field for investigation as to the questions whether coagulation invariably means sterilization, the extent to which antisepsis and disinfection are produced by coagulants, and how their therapeutic action is modified by the presence or absence of albumen, and especially as to the quantitative relationships of these agents to the amount of infected and decomposing tissue involved. All of these matters are, however, aside from the immediate problem which I have endeavored to set before you,—viz, Do coagulants prevent diffusion of antiseptics in the treatment of pulpless teeth?

Some one in criticising our general educational methods has made the following statement, which to some extent seems to me to be applicable to the question at issue :

"Our system of education is principally a process of mental stuffing. The habit of examining and criticising evidence is nowhere taught except in our law schools, and there only very imperfectly. To accept as true all that established authority says is true, and to store up such statements in the mind by an effort of memory, is the kind of training which principally prevails. And if it be granted that most of the utterances of accepted authorities are true, the power to criticise evidence, to determine that which is true or false, and to arrive at just conclusions, is still of far higher value than the mere memorizing of facts. But the fault is not alone confined to the cultivation of a habit of accepting statements of truth solely upon authority. It is equally true that things are taught in our schools of which, to say the least, their truth is yet an open question, and upon these doubtful questions it is insisted, more strongly than upon any others, that they should be blindly accepted upon authority."

I cannot close this paper without acknowledging my great indebtedness to Dr. L. F. Elstein, of Philadelphia, for his intelligent aid in preparing the bibliography of the subject.

FACIAL NEURALGIA DEPENDENT ON THE IMPINGEMENT OF A SECONDARY DEPOSIT OF DENTINE UPON THE DENTAL PULP.

BY SIGEL ROUSH, M.D., D.D.S., WASHINGTON, D. C.

MR. B., æt. fifty-two, was referred to the writer by his family physician. He was suffering from an obstinate case of facial neuralgia. There was considerable swelling over the infraorbital foramen and in the region of the anterior dental branch of the superior maxillary nerve. Along the track of the labial branch the patient experienced a sharp stinging sensation, which was greatly intensified by pressure. Both sides of the face were similarly affected. This condition had been gradually developing for about eighteen months. It began by a slight soreness in the regions mentioned, and although he had been treated by a dozen or more physicians, the case grew steadily worse. He was finally sent to the writer with instructions to have his teeth examined, and if any cavities existed, to have them filled. An examination revealed the presence of three or four small cavities, which were filled, also of a couple of diseased molars, which were promptly extracted. His lower molars had been removed fifteen years ago, and since that time he had masticated his food with his oral teeth. As a result, the upper incisors, cuspids, and bicuspids—all that remained in the superior maxilla—were worn to within a line or two of the gum-margin. With the encroachment upon the pulp-canal a secondary deposit of dentine had been thrown down, as is usual in these cases, and gradually forced the contents of the pulp-chamber into the restricted space of the root-canals. The line marking the union of the secondary deposit with the true dentine was unusually well defined, and showed that more than half of the original chamber had been entirely obliterated. The teeth were free from sensation when affected by heat or cold, and what was left of them seemed in a healthy condition. Having attended to the cavities and having removed the offending molars, the patient was dismissed, with instructions to return if there was no cessation of his trouble.

In about a week he again visited the writer with the symptoms even more aggravated than before. He was unable to obtain sleep, except by the use of opiates, and his whole nervous system was suffering in consequence. The swelling, which seemed to be worse in the mornings, had slightly increased, and the soreness had extended to a point almost over the Gasserian ganglion.

After another examination, it was decided to devitalize and remove what pulp remained in the canals of the superior dental organs, by which operation it was hoped to bring about the long-sought relief. Accordingly, a sharp drill was selected, and the secondary deposit of dentine removed until the approach of the pulp-line made the operation too painful to be continued. Arsenical paste was then applied, and held in place by gutta-percha caps. The next day the pulps were removed, and in due time the canals filled and the shortened teeth built down half a line or more with gold.

The desired relief was obtained. From the application of the devitalizing paste the symptoms began to abate. Natural sleep followed, and in a week's time the patient was free from a single symptom of facial neuralgia.

Mrs. B., æt. forty-seven, presented with excruciating pain confined to a line drawn from a point over the juncture of the branch of the anterior dental nerve with the second division of the facial or fifth nerve, to the apex of the cuspid. Pressure in this region produced exquisite torture. Her teeth were good and whole. There was no history of a nervous diathesis, and the general health of the patient was excellent. The cuspid in question was tapped, and the pulp removed. Under the microscope the presence of a number of spiculæ of secondary dentine was revealed. Like sesamoid bones, some of the irregular deposits were imbedded in the nerve-tissue. Others impinged upon the delicate terminal filaments and constricted the capillaries. In this case, also, instant relief followed the removal of the pulp.

It is the opinion of the writer that irritation of nervous tissue within the pulp-chamber is often transmitted to the facial branches of the fifth pair of nerves, and in many cases of so-called facial neuralgia the cause may often be located in the pulps of apparently sound teeth.

CURATIVE TREATMENT OF TIC DOULOUREUX OR FACIAL NEURALGIA.

BY V. JARRE, M.D., PARIS, FRANCE.

FACIAL neuralgia, known under the name of "tic douloureux," is the symptomatic expression of a lesion of the terminal nervous extremities, of a cicatricial nature.

It is in the cicatrix of the alveolar tissues or in the deep alterations of the tissues in that region as a result of a chronic alveolar dental periostitis, or arthritis, or during infectious disturbances brought on by a vicious eruption of the third molar, that is seated the fundamental nervous lesion, the subjective symptom of which is a spasmodic neuralgia of the face.

The cicatricial region of the alveolus which contains this lesion of the nervous extremities is determined by the etiological antecedents as indicated above, and also by the point of departure of the painful phenomenon which is often indicated by the patient. Finally, in a certain number of cases, an exploration of the gums, seized between the thumb and index finger, will bring on a painful sensation on a level with the suspected region. It is this region, comprising generally the extent of one alveolar opening, which must be well delineated, and if necessary exposed by the extraction of one or two teeth which limit the region on each side, before proceeding to its removal.

This operation must be done as follows. It can be divided into three parts.

First part. Excision of the mucous membrane and periosteum covering the parts of the alveolar border to be removed.

After having made a thorough antiseptic washing of the buccal cavity, and anesthetized the region to be operated by means of an injection of a two per cent. cocain hydrochlorate solution, a deep longitudinal incision is made along the free alveolar border, extending to the length of two centimeters through the mucous membrane and periosteum. A second incision, penetrating also down to the bone and parallel to the preceding, but only one centimeter long, is made on the buccal side of the alveolus at about the level of the alveolar region which was occupied by the apex of the tooth when in position. Finally, the two extremities of these two incisions are joined together by incisions obliquely directed from above downward,—that is, from the crest of the alveolus to the incision on the outside of the alveolar wall. When these two incisions are made, the mucous membrane inclosed in the incision has the form of a trapezium ; this is removed with the corresponding part of the periosteum.

The same operation is now made on the opposite side of the alveolus,—that is, on its palatal or lingual side an incision is made on a level with the apex of the alveolus on the lingual side, and joined to the incision on the free alveolar border. Another trapezium of mucous membrane and periosteum is removed, and we have now a denuded surface of bone starting from about the level of the apex of the alveolus on the lingual side, and extending to a corresponding line on the buccal side. These incisions limit the bone which is to be excised.

Second part. Excision of the denuded part of the alveolar border.

By means of a circular saw and the dental engine, two oblique sections of bone are made, following the lines indicated by the section of the soft tissues, and converging toward the apex of the alveolus, as it will be remembered that the incision opposite the apex, both on the lingual or palatal side and on the buccal side, is only one centimeter long, while the one on the free border is two centimeters. The section of bone is now only adherent to the maxilla by its summit. It must now be removed with a cutting forceps.

Third part. When all the osseous portion of the alveolar border has been removed, the osseous wound is scraped in such a manner as to remove all *débris* or irregularities which have been produced by sectioning with the cutting forceps. This part of the operation is carried on by means of a round bur, until the finger indicates that the whole surface is even.

The operation being finished, the wound is washed and dressed by means of antiseptic pellets of cotton introduced into the alveolus.

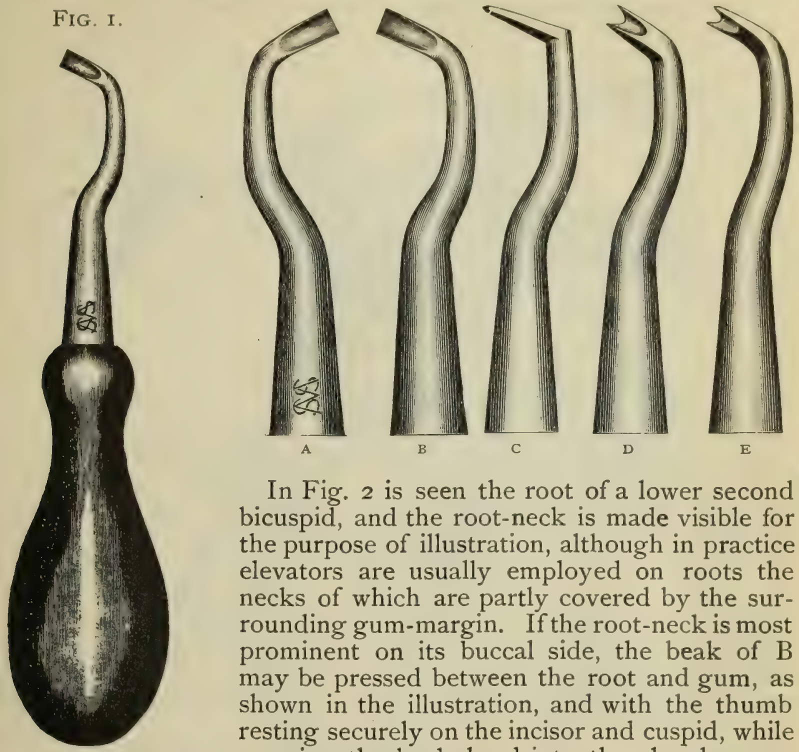
Every case treated up to now in the manner above indicated has been cured or greatly ameliorated.

ROOT-EXTRACTORS, OR ELEVATORS.

BY W. STORER HOW, D.D.S., PHILADELPHIA, PA.

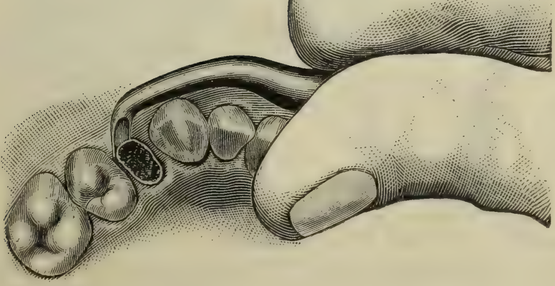
THE extraction of a tooth-root is not infrequently a matter of no little difficulty, and under some circumstances it may be found that a suitable elevator is the simplest instrument for its ready removal. Elevators have generally been made with larger beaks than necessary, and the illustrations, A, B, C, D, E, show the full-sized beaks and shanks of some preferred modifications of well-known elevator forms of recognized utility. Fig. 1 shows (half size) the style of ebony handle. Besides the reduction in size of beak, the shank has been given a re-curve to bring the operative end in axial relation to the handle, and thereby render more effective the turning and lifting stress on the beak end. This operation, though an old one and familiar to practitioners of large experience, has not been described in detail for the benefit of the student or neophyte.

FIG. 1.



In Fig. 2 is seen the root of a lower second bicuspid, and the root-neck is made visible for the purpose of illustration, although in practice elevators are usually employed on roots the necks of which are partly covered by the surrounding gum-margin. If the root-neck is most prominent on its buccal side, the beak of B may be pressed between the root and gum, as shown in the illustration, and with the thumb resting securely on the incisor and cuspid, while pressing the beak hard into the alveolar process, the handle should be rotated quickly to lift the root, at the same time forcing it out of its socket inward toward the tongue. If

FIG. 2.



the lingual side of the root-neck is the higher, then A is to be likewise used, as shown in Fig. 3. The forked beak of E may by some be preferred for pressing down between the root and buccal gum of such a case as is shown in Fig. 4, and then by a combined push and downward sweep of the hand the root is pried up and pushed out toward the tongue, taking care in every instance by a firm thumb-rest to guard against wounding the tongue or lip by losing control of the instrument. An additional preventive is to place the wrapped thumb or finger of the left hand on the opposite side from the beak,

FIG. 3.

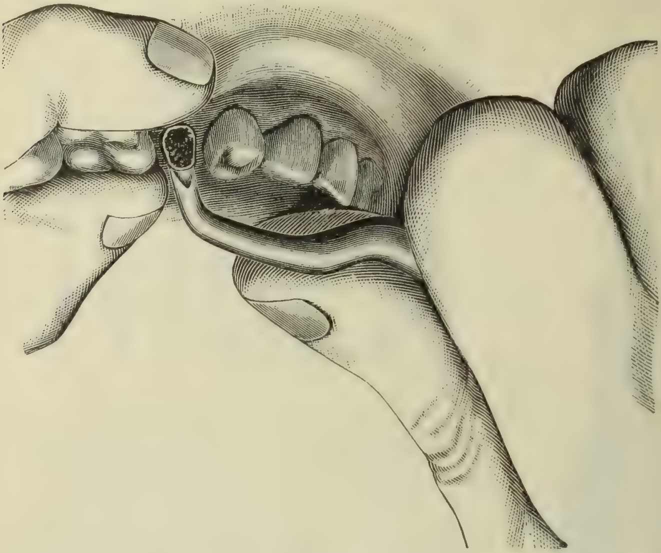
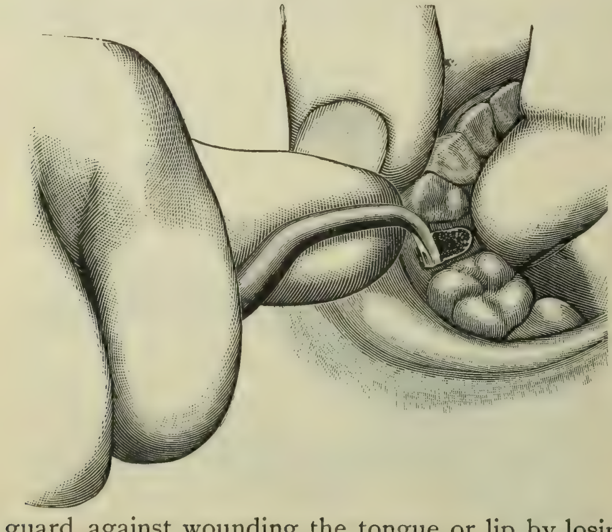
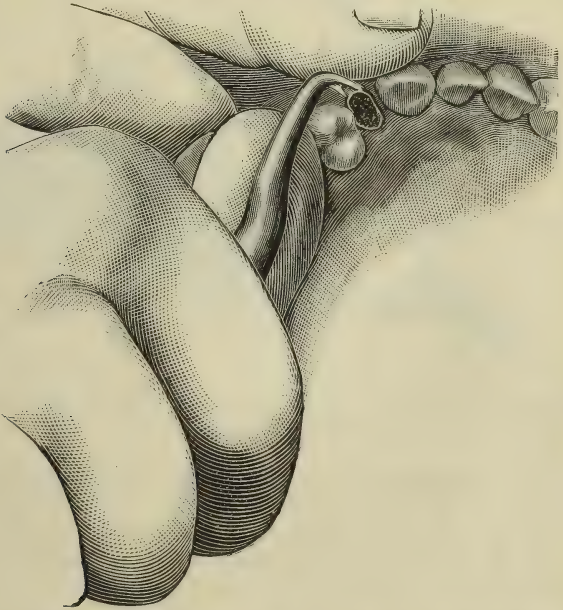


FIG. 4.



to catch its point in case of a slip. Fig. 5 shows E applied to the buccal side of the root of an upper right first bicuspid, and Fig. 6 shows B or D applied to the palatal side of a like root, and in both instances the pressure of the beak between root and process is accompanied by a rotative turning of the hand to throw out the root. Such roots may, with E, be hooked down and inward as shown in Fig. 5, or drawn down and outward with E, somewhat in the way illustrated by Fig. 6. In some instances the roots of deciduous teeth are left between the crowns of permanent teeth, and may be readily turned out with the narrow sharp beak of C, which is both right and left in action, and is well suited to the quick flicking movement desirable in removing deciduous crowns or roots without frightening the child by a display of forceps. In the case of any very fearful patient, the elevator is readily kept out of view in the hand until the moment of use, yet is never to be used without fair warning.

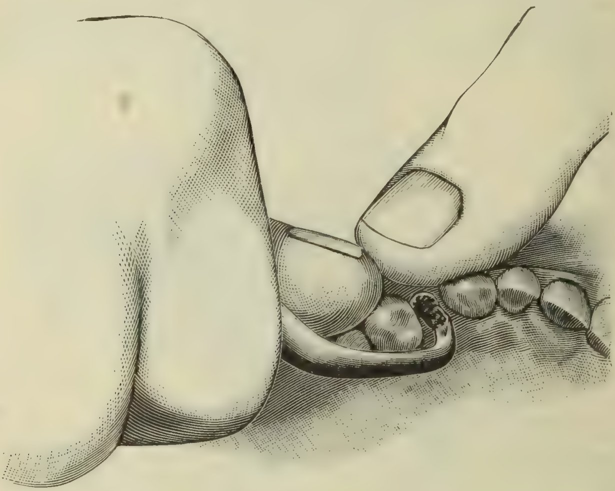
FIG. 5.



In difficult cases requiring the exertion of considerable force, a napkin several times folded should be held in the left hand, or wound over the finger, and held opposite, or, in upper cases, under the root to receive it, or take the thrust of the beak if that should slip, or the root-margin give way, in any case taking every precaution to avoid possible injury to the patient.

The hand-grasp being usually well toward the beak, and in application to a root coming very close to the lips, only a few illustrations of some phases of hand-grasp and root-application could be given, and these proved difficult of delineation even with the aid of photographic views. A particularly effective over-hand grasp of E for the downward pull of an upper cuspid root into the napkin-shielded left hand can only be described and without illustration, since the hand hides from view the elevator, root, and mouth. The illustrations given, however, serve to exemplify the fundamental functions of the elevators, with the principal methods of employing them. It remains only to observe that while A, B, C, and E will suffice as a set for most elevator operations, C, D, and E will also serve as a set, since D combines the functions of both A and B. Either of the instruments, especially A or B, will find occasional employment by a pushing insertion between the root and an adjoining crown which may either serve as a fulcrum for a lifting lever action, or as a buttress against which to effect a rotating action of the beak to lift the root from its socket.

Fig. 6.



In every case it will be best to consider the fact that, excepting those of the lower molars, the labial and buccal walls of the alveoli are thinner than the lingual walls, and a root may therefore be more readily reached with the beak, or be forced out on the thinner side, as the case may be.

RESTORATION FILLINGS IN INCISORS.—THE AUXILIARY DOVETAIL.

BY I. C. ST. JOHN, D.D.S., MINNEAPOLIS, MINN.

In approximal cavities in incisors involving the mesial or distal angles, the accepted method of removing dentine for lateral grooves and pits, and pits near the line of union of the labial and lingual plates of enamel, weakens the enamel. Such grooves, especially labial ones, are difficult to fill, and furnish little resistance to lateral or lingual strain. Excepting in cases of accident, these fillings are broken off by lateral or lingual strain only. Entire dependence is frequently placed on the dovetail at the base of the cavity. In such cases the point of the filling is sustained entirely by the strength or integrity of the gold. Where the lateral strain is great this is not sufficient, as the softness and malleability of gold will permit of the straining or bending of the most perfectly condensed filling, leaving a crevice at the line of junction with enamel; or the point breaks off, leaving the basal portion of the filling intact.

Many other unsatisfactory results confront the most expert and careful operators, but are too common to be given space in this paper.

An auxiliary dovetail on the lingual surface of these teeth (Fig. 1, A) affords greater resistance to lateral and lingual strain than any other method at present employed.

FIG. 1.

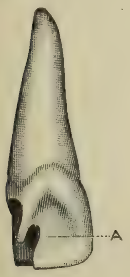


FIG. 2.

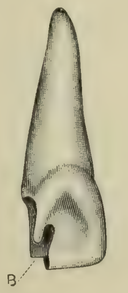


FIG. 3.

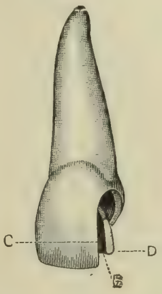


FIG. 4.

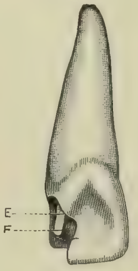
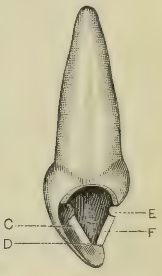


FIG. 5.

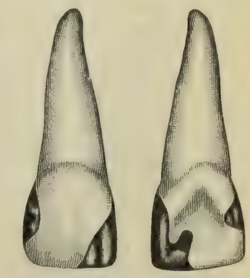


In teeth, especially laterals, which are thin labio-lingually, additional resistance can and should be secured by one of the following methods, or by a combination of them.

First. By the removal of a portion of the enamel as in Fig. 2, B, cutting away sufficiently to insure a good body of gold, thus providing against a shortening of the crown from abrasion.

Second. By cutting a narrow groove across the enamel on the labial surface and nearly penetrating it (Figs. 3 and 5, C). The remaining narrow line of enamel, D, is then to be ground down to about one-half its thickness.

Third. By cutting a similar groove on the lingual surface, with a like thinning of the enamel (Figs. 4 and 5, E and F). A cavity so prepared gives three dovetailed mortises,—one of gold, mortised into the dentine at the base of the filling; a second of dentine and enamel, mortised into the gold; and a third on the lingual surface, of gold, mortised into the enamel. The major part of such cavity preparation may be best performed with corundum stones and rubber and corundum disks, the latter for cutting the grooves and much of the auxiliary dovetail.



The following advantages are claimed for a cavity so prepared: A cavity simplified, easily prepared and easily and positively filled; avoidance of pain to the patient; conservation of dentine, which represents the strength of the tooth; and permanency in the completed operation, for resistance is provided to offset force applied to the filling from any direction.

THE SLAUGHTER OF THE INNOCENTS.

BY W. C. BARRETT, M.D., D.D.S., BUFFALO, N. Y.

(Stenographic report of an address before the First District Dental Society of the State of New York, January 9, 1894.)

It is with the greatest reluctance that I present before such a body as this an apology. Had any one else but my New York friends called upon me for a paper at this time, I should have said that compliance was impossible; but when your president asked me to bridge a chasm, to stop an otherwise inevitable gap, I said that I had too many friends here whom I loved, positively to decline, and I would do the best I could. I afterward wrote the president that I was utterly unable to furnish a formal paper. I had set about the task as earnestly as ever I did anything. But my life is not an idle one, and I think this winter is one of the busiest I ever had, and so when I attempted to write the paper I found that my brain was dry. I could not squeeze as much of thought from it as I could blood from a turnip, and repeated efforts resulted only in sorry failures. I asked of the officers that if any one else could be found I might be excused, as I could only give a talk, which was likely to prove but mere words. The answer was to come on, and the society would accept the talk. I made another effort, and got through the exordium, and then I stuck fast; I could write no more, for my brain was too weary. I ask of you to have due consideration for me under the circumstances.

Nearly ten years ago I was called upon to deliver an address before the American Academy of Dental Science, in Boston, upon the "Diseases of the Period of Dentition." I had from time to time read in dental and medical text-books, and in the current professional literature, of the terrible mortality due to the advance of dentition, and had accepted some of the conclusions without question. But when I came to reflect more deeply upon the matter, and to consider the physiological and pathological principles involved, I became convinced that there was an error somewhere, and in the address to which I have alluded I attempted to show that the advance of the teeth was not the principal cause of the diseases which so swell the death-rate in infancy. At that time my views were somewhat novel, and ran counter to generally accepted theories. They then met with and have since encountered opposition at the hands of many who are not pathologists. Further study and the opportunities for investigation have but confirmed me in my opinion, and I appear before you to-night for the purpose of again considering the subject.

You will therefore comprehend that this is not an entirely new matter to me. It may not be to you, for others have lately deliberated upon it, and there is hope that it may receive the consideration that its importance demands. Certainly nothing could engage your attention more worthily, for I believe that I am not exaggerating when I say that it more deeply concerns the welfare of the human family than any other pathological question that could be selected. We have but to reflect that unerring statistics prove that about one-third of the human family die during the period of first dentition, to demonstrate its paramount importance. If even any considerable proportion of these deaths are due to teething, it is our highest duty to consider whether something may not be done to avert this terrible mortality, beside which the horrors of war, pestilence, and famine sink into insignificance as destroyers ; because while the latter are but occasional visitants, the process of dentition is ever with us, and comes to every human being.

The study of infant mortality tables reveals some startling facts. They show that the death-rate is very far from uniform throughout the several months of the year. They prove that in some months certain diseases are peculiarly rife, and swell the death-rate amazingly, while in other months the same diseases scarcely figure at all. They show that the months in which we might expect the highest death-rate from certain disturbances are not always the most fatal. Every one must be aware that the zymotic maladies are an important factor, and probably the most of those who are not familiar with mortality tables will imagine that they are responsible for the great majority of infantile deaths ; but this is not always the case. The influence of the density of population and of sanitation is more pronounced in cases of communicable or contagious diseases than in those of any other class, but it is not confined to them. Furthermore, this influence is much greater in its ill effects in children than in adults.

That which is true of the zymotic diseases is in general terms true of the diarrhœas and dysenteries, and it is this latter class of troubles that mainly concern us, for it is not claimed that the contagious disorders are ever induced by teething. The charge which I wish to examine, then, is that the high death-rate in childhood is to a considerable extent dependent upon cutting of the teeth.

We have heard much during all our professional lives of the great mortality that is due to dentition. If it be the case that any considerable proportion of the deaths during infancy are due to the progress of dentition, it is incumbent upon us, as dentists and medical specialists, to study the situation and determine the cause. But I take as the foundation-stone for the argument which I shall attempt to raise, the assertion that all these are errors ; that dentition itself is not the cause of the great mortality which prevails among children. It is nothing more than one of the factors in human development. The teeth, under all normal circumstances, should grow as the rest of the body develops. When the child is first born into the world, all its organs are immature. This is as true of one set as of another. It is as evident in the muscular and nervous system as in the dentition. It is impossible for the child even to hold its head erect. None of its faculties are developed. Its legs are so weak that it cannot stand. Its stomach is as rudimentary as its muscular system. The child is unable to digest anything except food which is of the very blandest character. We can readily comprehend that at a time of such crudity in all the tissues and functions, the child will be almost defenceless against attacks from certain diseases. In the undeveloped condition of its organs it is liable to all sorts of disturbances. What is the character of the diseases that overtake it at this time, and which are so exceedingly fatal to it during the early periods of its life? I have placed upon the board certain tables of statistics, to which I desire to call your attention.

The first shows the probabilities of death from some special diseases, of a child that is born alive. We find that the probabilities from diarrhœas and dysenteries are .0343, while from typhus they are .0381. Typhus is a disease which is not as destructive now as it was years ago, for we are advanced in the knowledge of septicism, and physicians are enabled to control conditions formerly almost uniformly fatal. At the time when these tables were drawn, typhus was exceedingly rife. It may be classed with general zymotic diseases, and it is probable even that a considerable proportion of the deaths which are in this table ascribed to typhus might be due to gastric disturbances.

From scarlet fever we have	.0300
Whooping-cough	.0151
Measles	.0128
Hydrocephalus	.0112
Diphtheria	.0049

Phthisis, which you know is the most destructive of all the diseases to which the human family is liable, is .1144.

Summing up, we have—

From diseases of the lungs, and phthisis	.2640
From diseases of the brain	.1218
From diseases of the digestive organs	.0524
From diseases of the heart, and dropsy	.0766
From diseases of the kidneys	.0149

Those are the probabilities of death from the different kinds of disease, especially those which attack children and are most fatal to them. The diarrhœas and dysenteries play a very important part, it may be seen. When we include typhus, or a certain portion of it which might belong to digestive diseases, we have a large portion of the human family who will die of digestive disturbances of some kind. I have placed these upon the board that you may comprehend what the probabilities of death are, and compare these with other communicable and zymotic diseases.

This second table shows the mean age of persons by death from different diseases. I have divided them into three columns, male, female, and the mean of the two.

	MALES.	FEMALES.	MEAN.
All causes	28.2	30.8	29.5
Whooping-cough	1.7	1.8	1.8
Measles	2.5	2.8	2.7
Croup	3.1	3.2	3.2
Diphtheria	7.7	8.1	7.9
Scarlet fever	5.2	5.6	5.4
Smallpox	13.2	10.6	11.9
Diarrhœa	11.8	14.9	13.4
Cholera	30.4	32.4	31.4
Erysipelas	35.7	32.8	34.3
Rheumatism	39.8	41.4	40.6
Influenza	42.8	48.8	45.8
Carbuncle	59.2	57.9	58.6

You will notice that in males and females the average age at which they die from these diseases differs materially. In some the males die earlier, and in others the females.

We all comprehend that dentition will not interfere with the zymotic diseases. If from this table we eliminate the communicable diseases and those to which children are not peculiarly liable, it leaves for us little except the diarrhœas and dysenteries which can possibly be affected by teething.

Having struck out, then, the disorders which cannot be factors in the high rate of mortality among children under three years of age, I simply have to consider diarrhœas and dysenteries and digestive diseases. I assert that these are not due to teething, and I cite as my first reason this fact: Although dentition is proceeding alike throughout the whole year, the high mortality is confined to a very few months. If it were a fact that the diarrhœas and dysenteries were in any way due to the progress of dentition, to the cutting of the teeth, it would be true that they would be rife the year round, and would be very nearly the same in one month that they are in other months; that is, that in December as many children should die of diarrhœa as in July.

I have here some tables which show the birth-rate during the different months of the year in a number of different countries. I have taken four countries, France, Germany, Spain, and Italy, in the order in which I have named them. Counting 100 as par, or a basis upon which to figure, we have in January the number of births in France, 105; in Germany, 103; in Spain, 114; and in Italy, 107.

These are the averages for a considerable number of years. The average births in Italy are highest in February, while in Spain they are highest in January.

FEBRUARY.

France	111	Spain	108
Germany	105	Italy	114

MARCH.

France	109	Spain	112
Germany	103	Italy	110

APRIL.

France	106	Spain	102
Germany	100	Italy	116

The average birth-rate now falls.

MAY.

France	99	Spain	100
Germany	97	Italy	95

JUNE.

France	95	Spain	89
Germany	95	Italy	89

JULY.

France	96	Spain	88
Germany	96	Italy	91

AUGUST.

France	96	Spain	91
Germany	98	Italy	93

SEPTEMBER.

France	97	Spain	98
Germany	106	Italy	100

The birth-rate now advances.

OCTOBER.

France	95	Spain	100
Germany	100	Italy	98

NOVEMBER.

France	97	Spain	97
Germany	100	Italy	98

DECEMBER.

France	95	Spain	100
Germany	99	Italy	97

The highest birth-rate, then, comes in January, February, and March, in all the countries; in April it is near the average, and during the hot months it decreases. But there is not divergence enough at any time to interfere with the death-rate or mortality tables.

I have a couple of charts here which show the average death-rate throughout the different months in the city of Buffalo. On this first chart the blue line represents the death-rate during the different months, while the red line represents the temperature throughout the same period. In January we have an average temperature of twenty-seven degrees. In February the average was 24; March, 28.5; April, 41; May, 54; June, 65; July, 70; August, 67; and then the temperature drops materially. If we follow the death-rate upon the same chart, we find considerable variance, but in the main it follows the line of temperature. I do not mean to assert that this depended upon the temperature, but as a general thing it follows it. We have it commencing in January with a death-rate of 125. In February, March, and April there is no material variation; it does not increase with the temperature. In June it drops to 112. If this death-rate be in any way dependent upon dentition, there could not be this great variation, because the tables I have read to you show no such variation in the birth-rate.

I shall try to find a reason for it. In July the infant mortality shoots up to the amazing number of 327. This is the most fatal month of the year. In August it drops to 323. If it followed the temperature, it should go higher in August, because August is often hotter than July. It is generally considered that in most of the zymotic diseases August is the more fatal month, but these statistics show that it is not the case in infancy. In September it drops materially, to 225, and then down until it reaches the average. This is the list of children under five years of age who die from all kinds of diseases. I ask you to consider the death-rate in connection with the rate of temperature, and see the divergence between the two.

Here is another chart. It shows the deaths from diarrhœas and dysenteries, commencing with the month of May. The blue line indicates the death-rate. There is an average of 9 during the month. In June it is 24, and then it shoots up. See at what an appalling rate it advances! From a mean of 24 in June it jumps to 222 in July. These statistics are made up from the mortality tables of the city of Buffalo. I have another chart, showing the mortality by wards, but it will not be specially instructive to citizens of New York city. I use these charts because I have not the special mortality tables for this city, but there is no doubt that these will show the same general results. It should be remembered that Buffalo is situated in a northern temperature. If we could go as far south as Washington, we would find that the death-rate changes in the different months, but only in proportion as the season is earlier. In Buffalo the infant death-rate from so-called summer complaints reaches its highest point in July. In August, from 222 it sinks to 174. In September it is 82, and so on until in November we get to the lowest normal of 9 deaths. There is something exceedingly instructive in these tables, and they will bear a great deal of study. I shall allude to them again.

I claim that it is not possible that the great mortality among children can be due to the advance of dentition, because we find it varying so widely. I do not believe it can be from this cause, because in different localities you find that the death-rate materially changes. In the different wards of Buffalo we find the death-rate from the so-called diseases of dentition varying very much. There is another thing that materially modifies the death-rate in children, and that is the density of population. It could not change thus if it were due to dentition. The relative mortality materially differs with the density of population, and I have placed here a table which indicates it. This shows the population to the square mile, and the deaths under five years due to digestive diseases :

Persons to square mile .	166	186	379	1718	4499	12357	65823
Death-rate at all ages .	16.94	19.18	21.90	24.81	28.02	32.96	38.67
Death-rate under 5 years .	37.80	47.53	63.06	82.10	94 04	111.90	139.52

The death-rate materially changes in adults and children with the concentration of population. This table will profitably bear a great amount of study.

Another reason why I do not believe that diarrhœas are due to teething is that the latter is a physiological process. It is a growth which proceeds just as other organs of the body proceed. The teeth develop with the rest of the body, and though there may be accompanying pathological disturbances, they are of the same general character with those that sometimes attend other developmental conditions.

There is yet another phase of the subject. The so-called diseases of dentition are supposed to be confined to the period of dentition. What is really this era ? It is the whole age of the child, up to the date when all the teeth are erupted and fully developed ; from some months prior to birth to the time when all the teeth are completely in position. The appearance of the teeth above the gum, their mere eruption, is only an episode. It is not the entire process of dentition.

I have drawn here some forms of teeth that are partially grown. Before the birth of the infant we have a portion of the tooth developed. Those of you who have seen any fœtal jaws know that the germs of the teeth look very much like peas in a pod, and that the inferior maxilla bears very little more relation to the teeth than the pod which envelops them does to the peas. I do not propose to go into the histology of the case at all, and I am only giving this to you macroscopically. Here is supposed to be a section of the jaw. We have the enamel and dentine developing until there is a simple cap, which covers the pulp of the tooth, and which may be represented in this molar section. Here are teeth at different periods of growth. When a tooth begins to develop the root, it is not the fact that the crown erupts through the gums simply by the force of the lifting power. The eruption is a part of the general process. As well might you say of the child that grows two inches in the course of a year, that it has been lifted up from below. This is not the case, but the increased altitude is due to interstitial addition.

The gum itself, I believe, but seldom retards dentition. I do not wish to assert that it is never the case, because I can readily conceive instances in which this might occur. The bone which incloses the crypt is not closed together over the tooth entirely, so that there is not a complete osseous operculum. But we find portions of the bone overlapping the tooth-crypt, which is not entirely closed in. At least this has been the case in all instances that I have observed, and better authorities agree with me. Unless the bone be absorbed, it is not the gum which retards eruption. The lancing of the gums is nothing more than cutting through the soft tissue. It does not in any way enlarge the opening through the bone-tissue. But if the tooth be retarded, I believe it is more likely to be by non-absorption of bone than by the mere soft tissue of the gum.

When the gum is in a healthy, normal condition, it is a delicate pink color. When you do have a disturbance, it will present a different appearance. And yet this normal, pale pink color, and tense, glistening appearance of the gum, a certain indication that it is in a healthy, natural condition, is the very one for which most dentists and physicians prescribe lancing. When they find the gum stretched over the tooth, when they see the four cusps of a molar indicated beneath, then they say the gum is holding it back, and that it should be lanced at once. I contend that this is an error, because the eruption of the tooth is proceeding normally. There is no symptom of any disturbance whatever. When you do have disturbance and a retarded dentition, you will have an entirely different condition of things. I will try not to detain you too long in dwelling upon this, because I am well aware that I am speaking under disadvantages in not having committed to writing that which I desired to say, and in endeavoring to condense into an hour that which demands more time for its careful consideration.

I contend, then, that under all normal circumstances, when the germ is developing, unless there be certain pathological disturbances which must leave their impress, which must bring a train of symptoms that should be easily recognized, that dentition is proceeding normally, and that there is no necessity for the lancing of the gums of children. There may, however, be such disturbances. When there are, they will not be of the nature of the diarrhœas which I have shown you are so rife, and which increase the mortality to such a great extent. If that tooth were held back by the gum, thus causing a compression of the tooth-pulp or papilla beneath, what would be the natural result? A diarrhœa? By no manner of means. It would be a reflex nervous trouble of some kind. There would be spasms and nervous irritation, sudden waking from sound sleep with a scream, and all the train of like symptoms. Diarrhœas and dysenteries mean digestive disturbances, and those are the diseases which give the high death-rate among children, as the charts which I have exhibited amply prove. The real diseases of dentition play no part at all in mortality tables, for they must necessarily be of a distinctly reflex nervous character.

What are the facts accompanying the high mortality among young children during the period of dentition? The first three years are years of special development. When the child is first born into the world, its digestive organs are as undeveloped as is its muscular system. Its stomach is as incapable of converting the ordinary food of the adult as its muscles are to carry it about. As well ask a child of six or eight months to run around the block, keeping pace with you, as to ask it to digest the same food which you receive. My opportunities for observation in the feeding of infants have been unusual, because for some years I have lectured in the school for nurses in a child's Crêche in Buffalo, and I know that the facts which I give are the natural deductions of my observations there. The authorities of the Crêche hospital have adopted my views, and they are taught to and impressed upon the nurses in the training-school.

What is the feeding practice among the poor, among whom this terrible infant mortality exists? Throughout the long winter months they live upon an almost unchanging and unvarying diet. Near Buffalo, if you go out on the roadside in the spring of the year, you will see the Polish people, the residents of our "East Side," scattered all along, searching the vacant lots and smaller parks, digging up the dandelions and parsley and plantain for greens. I think they get very little of it before late May in Buffalo, and more often in June. That acts as a laxative, of course, to the digestive system of the adult. It proves a very pleasant change in their monotonous diet. They live so almost exclusively upon two or three articles of food during the winter that this diversity is very grateful to them. What is so palatable to them they think must be good for the baby, and they feed an infant of eight or nine months upon it; but the digestive system of the child is as unable to cope with that food as are its muscles for prize-fighting. What is the consequence when the child is fed with food taken from the table, perhaps from the mother's mouth? At first it spits it out with a wry face; but it is continued again and again, and after a time an appetite is created for it, as that for whisky and tobacco is laboriously acquired in later years. It is a foreign substance in the digestive tract, and must be got rid of. The first time the stomach rejects it; it is regurgitated without nausea; but finally that method of eliminating this indigestible matter is exhausted, and it may be vomited with nausea. Soon this means fails, and outraged nature seeks relief in another way. The mass is passed through the pyloric opening and hurried into the intestines. We know that all cathartic remedies are irritants of the digestive tract. This becomes an irritant, and has the effect of a cathartic, and that is the initial point of a diarrhœa. If the feeding should cease, there probably may not be a recurrence of the diarrhœa; but if it is kept up, the inevitable result must be a continued diarrhœa, which in time becomes chronic, finally degenerating into a dysenteric form, and death ends the scene.

Let us examine these two charts in the light in which I have been endeavoring to have you view them. Taking these tables into consideration, especially this one in regard to diarrhœas, you find the death-rate begins to go up in May, almost coincident with the beginning of the artificial feeding or the change in diet. It increases in June, and in July it shoots up with the extraordinary velocity which the chart indicates. It is not that the feeding commences at that time, but that it does not manifest itself in the death-rate until the diarrhœa has had time to work out its dire results. The child may have continued discharges for weeks before they will be manifested in the mortality tables. A large proportion of those who die from the feeding in May linger along until June and July. Hence the highest death-rate comes in this latter month, resulting largely, in my opinion, from the abnormal feeding, from the bad nourishment during May and June. If it were due to the temperature, we would find that the death-rate from diarrhœas would continue during August. You see by the tables that there is no cessation in deaths from other causes. Why should this be the case in digestive disturbances if they are the result of teething? But down goes the mortality in September, and in October it reaches a low point, coincident with a probable cessation, or at least partial suspension, of improper feeding among the poor, in whose midst the terrible infant mortality mainly exists.

I believe, then, to sum up the whole matter, that these so-called diseases of dentition, which are as I have shown you mainly confined to digestive disturbances, instead of being caused by the advance of dentition, are brought about by improper feeding; by placing in the stomach and digestive apparatus of the child food which it is unable to digest.

I might go on and consider the periods of the development of the digestive tract, but I have not the time. Did you ever consider the different periods of dentition in a human being? The advent of the incisors, the cuspids, the first and the second molars, mark decided eras in the life of the child. When they get the first permanent molar, that is the end of the period of infancy and the beginning of childhood. With the eruption of the second molar comes the end of childhood and the era of puberty. The last molar marks the period of full development and the beginning of adult life. We can determine almost with entire accuracy the condition of the digestive tract from the advance of the dentition.

Of course, this refers to all normal conditions. There may be such structural or functional aberrations as shall very materially change this, to which I have not now time to allude.

I repeat, then, that these high death-rates are not due to the changes in the teeth. I believe that the lancet is seldom called for, and the wonderful stories that have been told concerning the miraculous recoveries from spasms and convulsions constantly following its use are mostly hallucinations or inventions. I have never seen such an one, and I think that I have had as good opportunity for the observation of such cases as almost any one. I do not mean to say that they do not exist, but certainly they are not spasms from digestive disturbances induced by teething.

I ask of you to consider this matter carefully and seriously. Do not jump at conclusions. Do not from a single instance draw positive inferences; but simply consider the whole thing, and see whether this trouble does come from teething. Have we done our duty by our patients when we have simply lanced the gums, and stated that diarrhœas and dysenteries were due to faulty dentition? Have we acquitted ourselves of the professional obligations resting upon us if we have not exhaustively studied the matter in all its phases?

Let me read to you, in closing, the final paragraphs of a paper read by me before another meeting some years ago:

"Experience and careful examination will enable one to distinguish the comparatively few instances of general disturbances caused by dental irritation. You have already learned that, in my own opinion, these cases are rare. 'The child is teething,' is the vague explanation given to many an anxious mother by practitioners who are either incompetent to form a complete diagnosis, or too indolent and careless to seek for the hidden springs of disease; who are too heedless carefully to weigh all the symptoms, masked as well as developed, and who trust to luck for a verification of their hastily formed prognosis. I believe that this convenient make-shift has quieted the alarmed mothers and lulled the anxious friends of countless little innocents into a fancied security, and stayed the fears which might otherwise have instituted timely measures for relief, until, too late to save the little one, it was discovered that an alarming disease had attacked the vital organs, the very citadel of life. 'Only teething.' To how many promising young existences in which were centered the hopes, the ambitions, the heart affections of a family circle, have these words sounded the knell. 'Only teething,'—and the fond parents looked with but little alarm upon symptoms of the gravest character. 'Only teething,'—but when to their agonized ears came the sound of the clods of earth falling upon the little coffin, and they realized that with the words, 'Earth to earth, dust to dust, ashes to ashes,' the door which opened to a bright and promising future of years of comfort and happiness to be spent with the loved child when grown to manhood or womanhood was now forever closed, when all the world seemed but one wide churchyard in which to bury from their sight their loved ones, in this hour of anguish would it alleviate their pain to know that a great mistake had been made—that a fatal error had been committed? And if, to the conscientious physician, the knowledge too late should come that, to save himself a moment's labor and thought, he had lightly passed over indications that it was his duty faithfully to study, would not the sight of those grieving parents, the habiliments of mourning, 'the knell, the pall, the groan, the tear,' would not these things rest heavily upon his soul? That you, gentlemen, may be spared such vain regrets, the lashings of tortured conscience consequent upon manifest duty fatally neglected, I have endeavored, so far as my poor ability permits, to point out to you the danger of mistaking grave pathological conditions for mere functional derangements."

HYPNOTISM.

BY MRS. DR. J. FREMONT BURKET, KINGMAN, KANSAS.

HYPNOTISM, which at the present time is receiving so much attention from the dental profession, is a peculiar nervous condition, the phenomena of which have been recognized from very early times. It has been variously named in the history of the human race as *animal magnetism*, *electro-biology*, *clairvoyance*, *mesmerism*, *odic force*, and lastly, *hypnotism*.

These different names, mesmerism excepted, were given to it because of a theory advanced in explanation of it. Animal magnetism represented the theory that these phenomena were due to some magnetic force in living beings, analogous to the action of the magnet upon steel. Electro-biology, the theory that electrical forces were generated in living bodies that could influence electrically the bodies of others. Clairvoyance implied a power to discern objects which were not present to the senses, and so could not be known through them. Odic force was the name applied to Reichenbach's theory that these phenomena were produced by a natural force which could be developed by vital action, heat, light, chemical action, etc.

Hypnotism, derived from the Greek word for sleep, was employed to designate what was regarded as an artificial sleep, in which the patient is *apparently* asleep, and yet, as to sensation and motion, is under the control of the operator.

As far back in antiquity as history leads us we find that these phenomena were displayed in certain individuals ; and since science has declared that they have their origin in the nervous system of man, we are justified in concluding that they existed simultaneously with man's other powers. We feel warranted in believing that they first manifested themselves without being called forth or understood. As they became recognized, they were practiced for the supposed cure of diseases, for gain, and for the love of the marvelous.

The Egyptians, Chaldeans, Hindoos, Persians, Greeks, and Romans practiced them. Would-be religious leaders and some of the priesthood made use of them, doubtless to increase their power and their following. History says they threw their subjects into a "sleep" and "caused them to dream prophetic dreams." After studying this subject in the light science has thrown upon it at the present day, we can readily understand how the vague or clear remembrance of the patient, on awakening, of what happened during the hypnotic sleep, might pass for a prophetic dream, which dream was according to the will of the operator.

Coming down to more modern times, we find in about 1660 these things attracting attention in England. They were then practiced by the laying on of hands. There were many operators, but the best known was Valentine Greatrakes, an Irishman. He was supposed to work marvelous cures of scrofula, and throngs of people from all parts of Great Britain visited him. The remarkable part of the history is that men among the most eminent in science and theology were vouchers for his curative powers.

History gives us frequent repetition of these occurrences down to the time of Mesmer, whose practices became so widely known.

Mesmer was a German physician. He received his medical education at Vienna, and was doubtless well versed in the medical science of his time, having studied under De Haen and Van Swieten. While practicing his profession he gave some attention to the study of astrology, and was led to believe that the stars exerted an influence over bodies on this earth. He next sought to identify this influence with some force for its development, and, identifying it with magnetism, began to stroke bodies with magnets for the cure of disease. For ten years he proceeded in this way, till coming in contact with a Swiss priest, Gassner, who produced the same results by manipulation, he abandoned the use of the magnet. He went to Paris, where his proceedings are too well known to be dwelt upon here.

There are a few points, however, connected with his career there that claim our notice. One is the mysticism he employed (as of dimly lighted apartments, hung with mirrors, filled with odors, and the occasional sounds of soft, harmonious music), which revealed how imperfectly he understood the phenomena he was able to produce, although he claimed to have a secret concerning it for which he refused twenty thousand francs from the French government. Another is the serious bodily disturbances, as faintings, convulsions, affections of the heart, etc., which manifested themselves in his patients at the mystical meetings in his apartments. It is important to note that even at this date, prior to the scientific investigations since made, a commission of medical and scientific men appointed by the government controverted Mesmer's theory of magnetism, and declared the phenomena due to physiological causes.

He had many followers, and one of them went a step farther than his master and stripped mesmerism of mysticism, showing that the same results could be obtained without it.

A German chemist, Baron von Reichenbach, came forward about thirty years later with what he claimed to be a new influence, which he named odyl or odic force. He published a book in which he described this new force as "existing throughout the universe," and developed by different agents, as chemical or vital action, etc. It did not stand the test of time, and threw no light upon the subject.

It remained for Braid, of Manchester, England, at about the same time, to take the first important step in the scientific investigation of this subject. In beginning the investigation, he professed himself to be a doubter, not only of previously advanced theories, but of the phenomena themselves. He discovered, however, that he was able to produce artificially "a peculiar condition of the nervous system, induced by a fixed and abstracted attention of the mental and visual eye on one object, not of an exciting nature." He published a book of some importance, inasmuch as some of its methods have been successfully followed out by subsequent scientific investigators. He gave to this nervous state which he was able to produce the name neuro-hypnotism, from the Greek words for *nerve* and *sleep*. The first part of the word was soon dropped, and hypnotism became the new name for this old subject.

We will now note the manner of producing the hypnotic sleep and some of the phenomena. The patient is usually caused to gaze fixedly for from ten to twenty minutes at a bright bit of glass or coin held about a foot from the eyes, and high enough above them to strain them in the effort of vision. The pupils, which at first relax, afterward contract, and the eyeballs, which at first seem to sink in, project when hypnotism is complete. The operator may make a few passes of the hand before the patient, or softly stroke the cheeks, and may gently close the eyes if they do not close of themselves. The patient is now under the control of the operator. He is generally obedient to his commands, but sometimes the demand must be accompanied by a similar act on the part of the operator before the eyes of the patient; for the eyes, though closed at first, may afterward be widely open. He may be made to sit as if riding or driving a horse, may eat disagreeable food as if he relished it when told that it is a toothsome article, and, on the other hand, may make facial contortions on taking a pleasant drink if told that it is medicine.

Pure-minded persons may be made to do things of a degrading and, it has been claimed, of a criminal nature at the command of the operator. If in a weak hypnotic state, they may feebly object, and afterward remember it with disgust. The rigidity of the muscles is another very noted class of phenomena. The rigidity may be confined to one group, or may extend over the whole trunk, till the body, like a piece of wood, may rest, head on one object and feet upon another, and be able to bear, if placed upon it, the weight of an object equal to itself. There are derangements of sensation, so that the patient may not distinguish colors aright, or may hear sounds that do not objectively exist, or may have false sensations as of being hurt in some manner, or be insensible to pain if pricked with a sharp instrument. Oftentimes there is increased respiration.

Just how long a patient may be kept with safety in this condition the records do not tell us. (Edward Bellamy laid his plot on the supposition that they might remain for a very long period.) However, after a short time the patient may be readily aroused by the operator, when he will have a vague or sometimes a distinct recollection of what has passed while in that state.

One of the observed results of hypnotism causes it to be regarded with apprehension. When once a patient has been completely hypnotized, he is more susceptible to it a second time, still more the third, and so on till the operator need give only a fixed look or motion of the hand to produce it immediately.

These are the principal phenomena of the hypnotic state. M'Kendrick groups them under four heads: (1) Those referable to conditions of the sensorium or portion of the brain which receives nervous impulses resulting in movements of a reflex or imitative character; (2) insensibility to pain and perverted sensations; (3) increased irritability of the portion of the nervous system devoted to reflex actions; (4) states of the nervous centers controlling the movements of the eye and movements of respiration, etc.

In order to prove that the phenomena of the hypnotic state have their origin in the physiological conditions of the nervous system, it is necessary to find in the natural state the existence of such conditions as would, through the means employed by the operator, produce some of these phenomena. We will proceed to look for these. We have seen that in the hypnotized state impressions upon the retina may result in movements without the aid of ideation or volition on the part of the patient. A good illustration of this kind of action in ordinary life is that of a business man walking down-town to his office. He may be absorbed in thought; if a lawyer, he may be studying his case, giving his mind to it almost as wholly as if sitting alone in his office. Yet, that he is guided by sensory impressions is indicated by the fact that he will pass around any obstacle he may meet,—as a pedestrian, vehicle, etc., and his attention will be arrested immediately at the sight of some unusual object in his path, as a large puddle of water. In this case there is sensory impression sufficient to produce movements, but which for the most part did not awaken consciousness, hence did not call forth ideation or volition. Therefore the movements were for the most part involuntary. On the other hand, there may be a consciousness of sensory impressions when there are no such impressions. A good illustration is that of an absent person.

For instance, a man thinks of his mother in some distant place. He sees her face, its changeful expression, the color of her eyes, her hair, and even seems to be conscious of the touch of her hand as she was wont to lay it lightly on his forehead, yet she is miles away, and cannot at the time affect any of his bodily senses. This may be regarded as a conscious repetition of old impressions; and memory is but the "conscious repetition of old impressions." Hence in actual life there are sensory impressions without consciousness, and consciousness of sensory impressions when there are none.

Of involuntary movements we may find numberless examples in all mechanical operations calling for skill and thought; as writing, painting, instrumental music, etc. In each the process is at first laborious, each step having to be consciously performed. But, as the student masters his art, involuntary movement leaves the mind almost unhindered to create, direct, or enjoy, as the case may be. Perhaps we do not realize the important part involuntary movement holds in dental practice. Certainly no student (no matter what he may be in theory) is prepared to become a practitioner till his hands by intelligent practice are able to perform their part unconsciously, leaving the mind free to apply his fullest knowledge to the case in hand.

From these considerations we see that in every-day life some ot the phenomena observed in hypnotism are constantly occurring.

In seeking the origin of the hypnotic phenomena in the physiological condition of the nervous system, science has proceeded along various lines of investigation, only to find that they have led to no satisfactory conclusions. That of inhibition, advanced by Heidenhain, gives at the present time most promise of success. Inhibition, defined, means restraint. It seems to be established by satisfactory experiments that if a sensory nerve receive a powerful impression, it may inhibit voluntary motion; and in the same manner sensory nerve-cells may become inhibited. The formulated theory is, that "the cause of the phenomena of hypnotism lies in the inhibition of the ganglion cells of the cerebral cortex,"—the inhibition being brought about by gentle and prolonged stimulation of the sensory nerves of the face or of the auditory or optic nerve.

In accordance with this theory, that part of the brain devoted to ideation may be "thrown out of gear" or *inhibited*, and the movements of the patient in this hypnotic state are involuntary, due to impressions made upon the senses. A somewhat satisfactory explanation of this theory is due to the researches of such scientists as Jackson, Fritsch, and others. These men claim that there is a class of movements not dependent upon the cerebral cortex, but upon deep nerve-centers. These centers are the optic thalami and corpora quadrigemina, centers for sensory impressions from the skin and the retina; and the corpora striata, the centers whence emanate motor influences. In the case of voluntary movements, the effect of luminous impressions upon the retina, the path of excitation, would be, first, the corpora quadrigemina, thence to the seat of ideation and volition, whence additional impulses would be sent through the corpora striata to the crura cerebri, and spinal cord to muscles, causing a distinct voluntary movement. Now, if that part of the brain which is the seat of ideation and volition be restrained as in hypnotism, and the same external impressiom be received, the excitation would pass from the corpora quadrigemina directly through the corpora striata to the crura cerebri and spinal cord and out to the muscles, causing movements *seemingly* the same, but which would be involuntary. The first movements would be the result of ideation and volition, the second would be independent of or in spite of any such power.

We have noted that the usual manner of first inducing the hypnotic sleep is to cause the patient to gaze at a glittering piece of glass or a coin. Though this may not be sufficient of itself to induce this artificial sleep, there is far more potency in it than we commonly attach to it. Change is the law of life. Our attention is constantly shifting from one thing to another. Do we read, we pass rapidly from one word to another. Do we study a picture, we look at it from one point of view and then another ; or, does our visual eye seem riveted upon it, we are mentally regarding it in different lights. Do we look out upon nature, the scene continually shifts. So, having both the visual and the mental eye fixed upon a single unexciting object for twenty minutes would produce an amount of fatigue not easily estimated. Confirming the theory of inhibition, it is claimed that what seems similar to hypnotism does sometimes occur, for a brief period, in ordinary life. We speak of a person as being "rooted to the spot" at the sight of some awful and impending danger. As an example of this : A mother missed her little child, who had just learned to walk about. After a hasty search she discovered him standing on the railroad track, reaching out his little arms in evident delight toward the fast-approaching engine. Uttering a low cry of horror, the mother stood motionless while some one else rushed to the babe's rescue. In this case the powerful sensory impression would seem to have inhibited motion.

Again, persons are said to lose presence of mind in the face of great danger, as when a house is on fire. The owner may have valuable articles in it that he could easily save, could he act with judgment ; but he rushes frantically about, doing this or that as some one suggests, leaving his treasures to perish in the burning building. In this instance ideation and volition seem to be inhibited by the powerful sensory impression, rendering the man a mere automaton. Insensibility to pain is thought to be due to the different functions of the nerves, some conveying tactile sensibility, while others carry painful impressions.

The rigidity of the muscles is referred to reflex action originating in the spinal cord. These reflex centers in the spinal cord are in a degree under the control of the higher centers of the brain, and when they are restrained, or out of gear, as in hypnotism, the activity of these cord centers is increased and reflex actions are more easily induced. The changes in the eyes that have been noted are shown to be due in part to reflex action of which the corpora quadrigemina are the centers. The quickened movements of respiration are referred to the stimulation of the respiratory centers in the medulla oblongata.

Now, the perverted condition of the nervous system to which it is claimed these phenomena are due, together with the bodily disturbances sometimes manifested in hypnotic patients, is certainly of a serious character. Especially would this be the case if it were often induced. It has been shown also that hypnotism can be practiced by those who are ignorant of its cause and effect; hence it may be used by the empiric as well as by the skilled scientific dentist.

Although only a part of the hypnotic phenomena have been accounted for, scientific research has thrown enough light upon the subject to warrant us in believing that as the functions of the brain and spinal cord are thoroughly understood, hypnotism will be brought within the domain of medical science. Until then, is it safe to practice it? Does it not yet belong to the field of research rather than practice?

PROCEEDINGS OF DENTAL SOCIETIES.

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

THE First District Dental Society of the State of New York held a regular monthly meeting Tuesday evening, January 9, 1894, at the New York Academy of Medicine, No. 17 West Forty-third street; the president, Dr. William Carr, in the chair.

Professor William C. Barrett, of Buffalo, N. Y., delivered an address, the subject of which was "The Slaughter of the Innocents."*

Discussion.

Dr. A. W. Harlan, of Chicago. While listening to Professor Barrett's remarks some thoughts have passed through my mind, with reference to the importance of this subject to the unthinking physicians and dentists of this country, and more particularly to their clients. I do not know that the lecture was necessary particularly for this audience, because there are no new thoughts presented with which we are not most of us already familiar. The idea that dentition itself is the cause of so much mortality, while it exists in the ignorant popular mind, and is a superstition, yet the very latest writers on the diseases of infancy and childhood do not consider that dentition is a prime cause in such mortality. Professor Barrett has stated the necessity for adapting food to the child according to its age. No one supposes that a child, when born, has a muscular system developed, nor a stomach, nor anything else, any further than the knowledge of embryology would bring us to know. You cannot feed a child six months of age on ham, and expect it to thrive. The more broadcast knowledge is spread in the minds of people, with reference to proper feeding, the fewer cases of death we will have from diseases of the alimentary tract. I presume once in a while some child may die from the coincident eruption of a number of teeth, but from ordinary teething, no. It is a purely physiological process, and it is not responsible for all of the disturbances that are coincident with it. I remember reading a few years ago of some very well-known physician writing an article that was published in one of the Southern journals, where the minister said they were grieving to-day because the child of some person in that community had been stricken by the hand of Providence. A doctor got up and said it was not Providence, but that it was improper feeding, and that the child was killed in that way.

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* The address is printed in full at page 200 of the current number.

Dr. C. Heitzmann. The present topic is not strange to me. Dr. Barrett has drawn our attention to the fact that with elevation of the temperature, mortality rises almost proportionately. I know something of the statistics of New York city, and I can say they are very similar to those of Buffalo. This, of course, is circumstantial evidence, and not a direct proof of the matter. As Dr. Harlan has remarked, all advanced physicians who make a specialty of the diseases of children deny that dentition or the eruption of the teeth has anything to do with the mortality rate. From this point, Dr. Barrett's views are not new. I know a number of physicians personally, or by having read their articles, both in Europe and here, who claim exactly the same thing, that the eruption of the teeth does not cause diseases directly, and does not cause the mortality directly either. I must especially mention a very bright man's name, here in New York, and that is Dr. Seybert, who was educated in the Leipzig University, and who has for a number of years made a special study of these things. He is thoroughly convinced that the old-fashioned view that the eruption of the teeth causes diseases and death is wrong. The next step taken by Dr. Barrett is that the carrying of certain kinds of food into the stomachs of children, which are entirely unfit to digest them, causes derangements of the stomach, diarrhœa, and finally death. Dr. Barrett takes the ground that these children die not directly, but after several weeks of illness, mostly in July, which corresponds with the statistics of New York. He says that the Poles in Buffalo gather fresh herbs in May and stuff their children with them. How is it that children who are not fed in such an irrational way do die in large numbers, especially in July? One of the men who studied this question was wondering why July should be the most fatal month for babies, and not August. He finds consolation in the fact that July has carried off all the sickly babies, and what is left is the better class which has survived those miseries. Dr. Barrett's views, I think, are circumstantial on this point. Neither he nor Dr. Harlan has mentioned the food which is the greatest blessing to the babe,—milk,—but also the cause of all the mischief, if looked at in an unbiased way. We know that milk is a very favorable soil for the development of micro-organisms. We know that the milk brought to New York comes from considerable distances, mainly from New Jersey, and farther away, brought by the railways in cans very badly locked. We know that the handling of the cow's udder is a dirty affair at those places where the milking is done. An incredible amount of dirt has been shown by the centrifugal apparatus to be in the milk taken right from the udder, consisting of feculent matters around the cow and the filth on the hands of the person who does the milking. Germs are introduced into the milk, which naturally find a favorable soil for development in a few hours. When this milk comes to New York, it is full of micro-organisms, and these are the deleterious creatures which produce gastric troubles and diarrhœas which kill the child. This is not circumstantial; it has been proven. If we take into consideration that the higher the temperature of the air the easier will the spores develop in any organic liquid, we understand why high temperature causes such a death-rate. I do not examine milk very much; occasionally I get it in my laboratory, and then I give my opinion on it; but I examine a great deal of another organic liquid, called urine, and I know it is the temperature of the air around us that causes the development of such micro-organisms, and I repeat, it is the micro-organisms which directly cause the mischief. Of course Dr. Barrett is right in what he says, but why should we not consider the very simplest and plainest way of causing disease in children, and that is by feeding them with milk which is impure? Why do we boil our milk? Simply to destroy the germs. We are not afraid of milk taken directly from a clean udder, but we nevertheless boil the milk carefully to obtain a sterilized milk. Poor people cannot do it. They take the milk heated insufficiently, or not heated at all, and pour it into the child's mouth, and death follows. These ugly little creatures—not ugly to look at, but ugly in their action—are the cause of all so-called summer complaints. Nevertheless, do not let us go too far. Do not let us deny that teething has something to do with summer complaint or diarrhœa. Anybody who has seen a teething child must have noticed that the child did not look perfectly well. It is restless, sleepless, nervous, cries, grinds the gums and has itching sometimes, and there is not the slightest doubt that the eruption of the teeth through the gums—a natural physiological process, as Professor Barrett remarked—is attended by a certain amount of hyperæmia. The gums are red shortly before the eruption of the teeth. The secretion of the mouth, the saliva, gathers in such mouths, and if such children are not kept clean, fermentation will take place in the child's mouth. Micro-organisms will develop there, and they may be swallowed with the milk or the saliva, and again there is a possibility of the disease being brought forth.

From my observations of my own children and grandchildren, I do not claim that teething is a direct cause of disease; but I am loath to admit that teething is altogether an inefficient factor in producing disease, simply because the hyperæmia of the mouth, the accumulation of the saliva, will favor the development of micro-organisms in the child's mouth. Thrush is found in the mouths of the children of the poor as well as the well-to-do. That is mildew, and nothing more.

Professor Barrett is right in what he says. He is supported by all advanced modern physicians who deal with diseases of children, both in Europe and in America. Not one of them will claim what the old-fashioned physicians have said. We also have eruptions of the skin caused by the oozing of the saliva, eczema, etc. It is an indirect outcome of the teething. What bacteriologists have done of late is to sterilize the milk before you give it to the child. We adults do not drink milk unless it is boiled thoroughly, and we should never give it to our babies. Even the mother's milk gathering in the mouths of teething children may have a bad effect on the child; much more so cow's milk, which goes through so many hands, and is sometimes mixed and adulterated accidentally or purposely by the traders who sell it. Give the babe, therefore, sterilized milk. My friend, Dr. Seybert, of New York, and some other gentlemen in the last few years made a very simple apparatus in which the milk is sterilized by heat before being given to the child. If you boil your milk and keep it open in the room, in an hour or a shorter time micro-organisms will develop; but if you sterilize the milk by boiling it, and immediately before giving it to the child, the danger is diminished. It is incredible what men have done in bacteriology within the last few years. Of course the German and French are ahead of all. When I first heard, in 1882, that tuberculosis was caused by a micro-organism, I was thunderstruck. Not one of us had ever thought that tuberculosis, a disease mainly of the lungs, should be an infectious or contagious disease. Professor Virchow, the great learned man in Berlin, pooh-poohed the idea for a long time. When I was in Berlin, in 1890, I asked him whether he was still so much opposed to the idea. He shrugged his shoulders and said, "You cannot resist facts." It is so, and almost every month and almost every hour new revelations in this line are brought to our notice. Quite recently it has been claimed that the micro-organism of smallpox has been discovered. Measles, scarlet fever, and syphilis are not yet understood, but many diseases which are caused by germs have been found out.

If we know these facts, we learn how to keep ourselves and our children clean. The blessing of cleanliness, hitherto a privilege only to the wealthy, ought to be, and will in due time be, transferred to the poor, and then we may say we have done a world of good to mankind, for we will have done more than cure disease,—we will have prevented it.

Dr. C. E. Francis. The lecture of Professor Barrett and the remarks of Professor Heitzmann were very interesting to me. Both gentlemen have gone over considerable ground, but seem to come to the conclusion that indigestion or the fermentation of indigestible food is the cause of many troubles in children that produce sickness or death.

Professor Barrett spoke of fresh herbs or "greens" that are gathered in the spring, boiled for dinner, and fed to children, as a kind of diet productive of injury to their health ; and Professor Heitzmann thinks that much sickness among children is occasioned by feeding them with impure milk.

But there are other things given to children to eat which they ought not to have. Quantities of confectionery are given by nurses and others, and much saccharine matter is taken into their stomachs, which causes acid fermentation. I have also many times seen very young children munching green apples, which can hardly fail to make mischief.

As regards the various forms of sickness that have been attributed to an irritated condition of a child's mouth during the period of getting its teeth, opinions differ. "Teething" is a physiological process, and I think the gums do not often require lancing. We, however, occasionally see children rubbing their gums with their fingers, biting on everything they can get hold of, and secreting a quantity of saliva, giving evidences of glandular excitement. In such cases it may be well to use a lancet. Cases of convulsions have often been attributed to getting teeth, but I think too much mischief has been attributed to teething. Most of these infantile troubles are, I think, due to irritation of the stomach and alimentary canal as a result of improper diet.

Dr. S. G. Perry. I have in thirty years' practice lanced the gums only in a very few cases, and those were in the early days of my practice. In later years I have looked upon the troubles arising from dentition as something like that trouble which the physician speaks of when he comes in, and not seeing anything else the matter with the patient says, "You have a cold." The doctor, seeing nothing else the matter with the child, says it is the teeth. This notion has been transmitted from the early teachers, and like a stone going down-hill, goes by its own impetus and never stops. Dr. Barrett's reasoning is very good. I think it is impossible to escape the logic of his conclusions. The force of Professor Heitzmann's remarks is also very great. I think that close attention to all articles of food, from the standpoint of bacteriology, is of the greatest importance. I have talked about micro-organisms before this society and before the Odontological Society for many years, and their relation to all kinds of diseases in the mouth, and have been laughed at a great deal for venturing to believe in that sort of thing; but as the years roll on I notice that the converts increase. It seems to me Dr. Barrett makes one distinction that I should imagine would hardly hold. He speaks of diarrhœal diseases and also of what we call germ diseases. It seems to me that all diarrhœal diseases are germ diseases. I may be wrong, but Professor Heitzmann can answer that question. There should not be that distinction between them. I believe that micro-organisms are the greatest danger that we have to meet in the world.

You may talk about the influence of sin and the reward of virtue, —you have the devil right near you all the time: in the street, when you take a walk, in the air you breathe, in this very room where you are now, in your mouths and stomachs, and in your blood, and you survive only because of your good constitutions.

Dr. R. C. Brewster. If the death-rate in July attains its highest pitch principally because of the heat, I would like to ask why is it that in the following month, August, when the heat is still greater, the death-rate does not maintain its high point, but decreases?

Dr. Heitzmann. Buffalo shows that the assertion of the gentleman is not fully correct. The temperature in August in Buffalo sinks, and so does the death-rate. In New York it is the reverse. August is hotter than July, and still the death-rate is smaller. I jokingly alluded to the remarks of one doctor why that is so: All the children of the poor die off quickly in July, and what is left, in August, on the principle of the survival of the fittest. Dr. Barrett tries to get around that point, claiming that the children are fed in May or June by green herbs, and get sick, and sicker, until they die in July; but he is right, you see. Both the temperature and the death-rate go down together. Perhaps the joking remark of the doctor who said there was a survival of the fittest may explain the puzzle.

Dr. Barrett. I desire to say a thing or two in regard to the sterilization of milk. This, as we all know, forms an important part in the diet of young children. The mother's milk at the birth of the child is of very different character from that when the child is six months of age. If a physician is seeking a wet-nurse, he will not take one who has a child six or eight months of age, to nurse the new-born infant. The milk is more highly organized. The child's stomach cannot digest it. It is the same with cow's milk. No man will dispute what Dr. Heitzmann said in regard to it, but that that is the sole factor I cannot admit, because if it were the case, we would find this mortality table materially differing. As has been stated, in August the heat is usually more intense and more continuous, yet the death-rate is highest in July. The sterilization of milk is the same in July that it is in August, so that while that is an important factor, it is not the only one. There is something else, and that is the fact that the milk of the cow for the young child, whether sterilized or unsterilized, is indigestible. I can cite to you a case that came under my own observation. In southwestern Colorado I met a lady who had a young child. It was dying, and she could not conceive what was the matter. She had not nursed it herself, and could not conceive a reason for the continual diarrhœa which was sapping its little life. The child was going down, down to its little grave, and the weeping mother said to me, "I have no longer any hope of raising it. We have a cow of our own, we are as careful about its food as possible, we boil the milk, and yet my baby is failing day by day, because of this obstinate diarrhœa, which nothing will control."

I told her what in my opinion was the matter: that the child was slowly starving to death; that there was no development; that it could not digest the food, which was too highly organized. I reminded her that I had myself seen her feed it from the table and give it coffee to drink. I promised that when I got back to a land of civilization I would send her some peptonized food, which she should exclusively use, and she promised to report upon it to me. Each of us kept our word, and she wrote me that within twenty-four hours of commencing the new feeding there was a marked change. Within a week the diarrhœa had practically ceased. In a month the child was fat and well nourished, and development was proceeding at an almost unprecedented rate.

I had supposed that I was presenting something that was more novel to you than it proves to be. Ten years ago, when I first presented this subject in Boston, I was attacked. I know that the text-books continually refer to the death-rate that arises from dentition. I think we are getting out of that rut, and that even medicine is taking broader views.

Let me refer to the remarks of Dr. Perry. I have made a distinction between the so-called contagious diseases and the diarrhœas. While the latter are in a great number of cases due to micro-organisms, there is a marked difference between them and the infectious or contagious diseases.

On motion of Dr. Perry, the society extended to Dr. Barrett a vote of thanks for his instructive and entertaining lecture.

Adjourned.

B. C. Nash, *Secretary.*

SECOND DISTRICT DENTAL SOCIETY, STATE OF NEW YORK.

At a regular meeting of the Second District Dental Society of the State of New York, held January 8, 1894, Dr. E. T. Darby, of Philadelphia, read a paper entitled "Relative Merits of Filling-Materials," which is printed in full at page 175 of the current number. Following is a report of the discussion of the paper.

Dr. D. W. Barker. There are some points of the paper which I cannot discuss. I cannot say that I have ever filled a cavity entirely with tin. When I commenced practice, the old forms of amalgam were going out of use and the better forms were coming in, and these were so good and have been improving so much, that tin has been largely crowded out ; so that an entire tin filling would be somewhat of a novelty for me. I have, however, used tin in combination with gold, to protect the cervical margins. In speaking of gold fillings, we have always to remember the cervical margin as the weakest point. I remember very distinctly some seven or eight years ago seeing some large approximal cavities in bicuspids. They were compound, involving a portion of the grinding-surface. They had been filled with gold by some very good operator, and had failed. I filled them temporarily with gutta-percha, and in the course of a year or so I refilled with gold, building the cervical margin with tin, putting a matrix in and a layer of tin, and then perhaps nine-tenths of the cavity with gold. I have seen these fillings since, and they are first-rate, and the cervical margins have remained intact.

In reference to amalgam and gold in combination, I have used it considerably with a great deal of satisfaction, and use it in two ways. One way is that of which Dr. Darby speaks, while the amalgam is still soft to pack the gold right in it, and continue to pack it. That cannot be done in compound cavities, in which case I usually put my amalgam in and build up perhaps one-half to two-thirds of the approximal surface of the cavity, and allow that to harden, and then at a later date complete it with gold. Now I will make an admission which I suppose I ought to blush to make,—namely, that I have done that operation on front teeth, and the results seem to justify its use. I have filled a frail cavity in a lateral or central with amalgam, and while it was still soft I have scooped out a shallow cavity in the front part of it and then allowed it to harden, and then excavated my cavity in the amalgam. The gold is merely a facing in the front part of the amalgam. Look at it from the front, and it looks like all gold ; look at it from the back, and it looks like all amalgam. I have done that several years ago, and I have never seen one of them fail ; those frail edges have not broken, and the amalgam has held. It will hold in a shallow cavity better than any other metal filling, and that is a way of using it that I don't think I have ever seen described in any dental literature.

Speaking of cement, a gentleman of my acquaintance has some cement fillings in some lower bicuspids, and I asked him how long they had been there, and he said thirteen years. They were put in by a gentleman of this city, who is practicing medicine now. It is seven years since I first saw them, and they are still as good as when first put in. That is the best lasting cement that I have ever seen. I wish I knew what kind of cement it is.

Dr. S. G. Perry. Only one word, and that will be of universal commendation of the paper in all its details. It is a paper not to be discussed, for there is nothing to take exception to. Three points :

First, I consider tin foil of very great value as a filling-material, and I believe that the profession for a good many years have gone by it without appreciating its value.

Second point, the great value of the combination of amalgam and gold as indicated in the paper. I don't know who was the originator of it, but Dr. Klapp first called special attention to it. It is very valuable for extremely difficult places that would be very hard to fill with gold. I used to think it was necessary to allow the amalgam to harden and put the gold in at a later day, but now in all teeth where a matrix can be properly tied I combine the two metals at once, and finish the operation at one sitting.

Third. I think we have not fully appreciated the advantage, in making large amalgam fillings, of taking off the excess of the mercury at the final finishing by the use of crystal gold. I do not know of any other means so prompt as this of freshly annealed crystal gold. It has been my practice for quite a number of years, in all amalgam fillings, to take off the excess mercury in this way.

Dr. C. B. Parker. I want to speak in reference to Dr. Perry's remarks in relation to the finishing of amalgam fillings. I don't think that the improvement in amalgam is as much as it is in the method that he uses. I am using the same amalgam that I have used for quite a number of years, and for the past three or four years I have been finishing all my fillings by the method that he uses, with the exception that I use Robinson's felt foil. It will leave your filling finished as beautiful as a gold filling, and amalgam fillings that have been finished in that way don't look at all like the fillings that I have finished previous to using felt foil.

Dr. John D. Thomas. I will simply remark that I can see in my practice, which is exclusively that of extracting teeth, a great improvement in the practice of dentistry, in the saving of teeth. There was a time when gold was considered the only thing fit to fill teeth with, and a tooth that was not worth filling with gold was not worth filling at all. Perhaps I may say the specialist in extraction has a mortgage on nearly all dead teeth in time, but through the improved means which you have of saving them it delays the time of foreclosure a good while.

Dr. D. N. McQuillen. I can only echo all that Dr. Darby has said to-night in his paper. I am a great believer in the conservative use of all materials. They all have their place. I have never yet seen the necessity of putting amalgam in front teeth, and would rather fill a tooth, if it required it, every six months, than use amalgam in a front tooth. In a tooth that is so badly decayed that we can't use gold, we can get very good results with plastics.

Dr. R. Huey. I would like to add my feeble word of commendation to what has been already said about the excellent and practical paper, especially thanking Dr. Darby for his suggestions concerning the working of tin. I shall try the method at once, and I think with satisfaction.

The relative value of filling-materials seems to be greatly influenced by so many conditions in the mouth, that we must always decide what material will be the most valuable under the given condition. Gold might be the very best at one time, and the worst at another, and so throughout the entire list.

A word in defence of the much-abused copper amalgam. While it is treacherous near the gum-margin and always uncertain, we may obtain on the grinding-surfaces of poorly calcified living teeth of young children, especially in partially erupted permanent molars, results that would be difficult to secure with any other form of filling-material. The objection to copper amalgam is its uncertainty. Let us experiment until we can be assured of uniform results. There must be some good reason why in the same mouth and from the same ingot, at different periods, we should have such amazing variations.

Dr. A. L. Northrop. As regards the paper, it goes without saying everything that Dr. Darby has said is all right. As far as tin fillings are concerned, I remember my old partner, who has been dead for several years, showing me a patient of his who at the time had fillings in her mouth of tin foil that had been standing forty years. The teeth were not discolored. I don't think we realize the benefits there are in tin fillings.

The method of uniting tin foil and gold of which Dr. Darby speaks, reminds me that when I was in Paris a year ago, Dr. Daboll was speaking of that method, and he said the way to get the best result was to make it fresh and not leave it standing any length of time ; he got better results in preparing it at the time of the operation.

Dr. Wm. Carr. In my practice I am influenced in the selection of materials by the age of the patient and the calcification of the teeth ; until the age of twelve years using tin foil or amalgam,—preferably tin foil,—and these fillings are rarely removed until the patient is eighteen or twenty years old. In many cases they are not removed at all, but remain as permanent fillings. If the anterior teeth are decayed and poorly calcified, I usually fill them with gutta-percha, renewing it as often as necessary until the age of twenty years.

In the combination of gold and amalgam for approximal cavities, I usually fill the cervical portion with amalgam, allowing it to crystallize, and at the next sitting completing the operation with gold. I think this method preferable to finishing at the first sitting.

I have found a great drawback to the combination of tin and gold. In a year or two after filling, the tin becomes granular and the filling worthless.

Dr. M. L. Rhein. As an old pupil of Dr. Darby, I can only re-echo the sentiments already expressed as to the pleasure it has afforded me to listen to the paper. The point of greatest interest to me was in reference to the combination of tin and gold in fillings. Dr. Darby, in discussing this subject, alluded to the defective results sometimes discovered at the cervical margins after such a filling has been some time in the mouth. With the exception of Dr. Carr, most of the gentlemen who have preceded me in this discussion have extolled the merits of tin and gold for especially preserving the cervical borders from future disintegration. My observations have been in accord with those of the writer of the paper and with Dr. Carr, and consequently I have refrained from using tin and gold as a filling. Numerous fillings have come under my observation, inserted by men of the highest attainments, which I was forced to replace, on account of the trouble produced by deterioration of the tin, not alone at cervical borders, but also in crown cavities. Some years ago, while in charge of the clinics of the First District Dental Society, I furnished a patient to a very capable operator. She was a girl aged about fifteen, for whom the clinician inserted a tin-and-gold filling in the crown cavity of a first permanent molar. A feeling of moral obligation compelled me to replace that filling about one year later. At this time the filling was found to be a total wreck. An instrument would pass through the filling at almost any point; while the tin at the bottom of the cavity was found to be in a state of complete disintegration, the gold seemed to be in good condition. The discussion on amalgams has certainly been very interesting. All the methods advocated this evening for avoiding an excess of mercury in the filling have been tried by me and abandoned for something better, which I explained at a meeting of the State Dental Society in 1888. There must be no guesswork about the amounts of mercury and alloy to be used to make a proper mix. Before mixing my amalgam, which I prefer to be plastic enough to enable the tooth to be well contoured, the mercury and alloy are separately weighed in a pair of scales provided for that especial purpose. Having packed the amalgam in small masses by means of the rotary method until the filling has thoroughly restored the lost portions of the tooth-structure, cover every exposed portion of the filling with small pieces of very thin gold foil (about No. 1), heated on mica. These pieces of gold will gradually disappear from sight, and more is added by being gently rubbed over the filling by means of heated burnishers. The gold will be entirely taken up by the excess of mercury and disappear, leaving perfect edges and a finish the color of bright steel, which will take as fine a polish as a gold filling. An experience of over ten years with this method of finishing an amalgam filling has convinced me that it produces an amalgam filling superior in every respect to any inserted in any other manner. The method of inserting one portion of a filling with amalgam and completing with a gold filling has many advantages in certain cases, especially where it is difficult to obtain a perfect contour with amalgam. In such cases I prefer allowing the amalgam to harden, and insert the gold filling at a subsequent sitting.

Dr. A. L. Northrop. We have heard to-night of tin fillings that lasted for thirty or forty years, and as I understand by the last speaker it is when it is mixed with gold and when it comes in contact with the cervical walls that there appears to be a deterioration of tin. The last speaker indicated that a tooth which had been filled at a clinic had shown signs of a deterioration in the tin foil, which had entirely destroyed the filling, and he replaced it. Please let us know the chemical process that destroys.

Dr. Wm. Carr. I do not know what causes the destruction of tin in the combination gold-and-tin filling. I asked Dr. Palmer, who has given this subject considerable thought, to what he attributed it. He did not know, but thought it was due to electrical influences.

Dr. Rhein. I have not the slightest disbelief but that those fillings are very successful in some mouths. I would like to say this, that in inserting a gold filling I think the danger that is feared at the cervical margin is most invariably due to the lack of thoroughness on the part of the operator in reaching practically sound tooth-structure. If he builds on tooth-structures that are already deteriorated, then he is going to have trouble with any filling he puts there. In my judgment, I think the failures resulting from the use of tin and gold are due to a certain condition of the oral fluids in the mouths of those particular patients. The method may be successfully used in some mouths, and still be productive of failures in others.

Dr. Edward C. Kirk. In relation to the immediate question of why there is sometimes a dissolution of fillings composed of tin and gold, I answer frankly, I don't know, and I don't believe anybody else knows. I might guess that it is the result of galvanic action, but I don't *know* that it is. A great many have guessed at it. There has been the usual amount of guessing about a number of the questions discussed here this evening. Dr. Perry stated that the paper of the evening was a very difficult one to discuss, and to this I fully agree; but it seems to me that it is highly suggestive, and we may draw some inferences from it that will be of value to us. We have heard that there is no such thing as an ideal filling-material; that all are in some degree deficient. We have a very wide range of filling-materials, each one having qualities that give it preference over the others under certain conditions. We have had our attention drawn to the different kinds of amalgam. I have no doubt every gentleman here has his favorite kind of amalgam, that he likes better than any other. I would like to ask if any gentleman knows the exact composition of his favorite amalgam? or if he has investigated the exact relation of the quantities of mercury and of filings he uses to produce the best amalgam filling that he can? I think it is doubtful. We have had raised the question of other plastics,—of gutta-percha, for example. It has been noted that gutta-percha usually has added to it certain mineral or inorganic materials to produce certain desirable working qualities. I would like to ask if any gentleman knows whether any of those earthy materials has greater value than the others, and if so, which and why? There is probably no filling-material that we use that has such a variety of physical properties as oxyphosphate of zinc. It is the most protean of all the plastics so far as physical properties are concerned. It is very important that every one of us should know something of the physical and chemical properties of the materials with which we are dealing, before we can intelligently discuss a question of this kind. The one great need of dental education is that students shall be well grounded along that line. This question of guessing at results, instead of knowing what we are talking about, has become so much a part of the dental habit of mind that I heard it exemplified by one of our prominent practitioners as he got into a car and sat down by a friend and took out his watch to consult the time, and the friend said to him, "Your watch is wrong; you are ten minutes out of the way." The gentleman replied, "Very likely, for I dislike this horrible accuracy in the matter of watches; why, I would not own a watch I could not guess by." The thing that we need most in dentistry is a greater familiarity with the methods of scientific observation before we publish our results.

Dr. W. C. Barrett. I should have been better pleased had I been allowed to remain a listener during the whole evening. However, I will not keep silence when I have been so cordially invited to say something.

It is needless to offer words of commendation of the paper of the evening. Enough has already been said, and I am sure that Professor Darby would prefer an intelligent consideration of the questions which he has advanced to any words of personal praise. I am especially pleased with what Dr. Kirk has said. There are too many assertions that have been accepted as proven from single individual instances. Instead of going on with a series of experiments, and making a succession of observations covering perhaps years of time, until there is an accumulation of testimony, too many dentists try a thing once and accept the conclusion as definite, while another makes quite as hurried an experiment and gets an opposite conclusion, and they lock horns at once. I want to urge upon all the fact that not one or two or a dozen trials are sufficient to establish the merits or demerits of any material or method in our practice. It is only patient, long-continued observation, conducted in a thoroughly scientific manner, that will entitle a man to rank as an expert authority.

I am very much pleased with the expressions in the paper regarding tin foil. There has been universal commendation of that material; so far all are in favor of its use. How many of you use it in daily practice? I believe that if but one filling-material could be saved out of a universal dental wreck, tin foil should be the one that we should choose. I believe that with it more teeth can be saved than with any other single material, not excepting gold. It is adapted to a wider range of conditions than any other single material. But while all agree that tin is so often the best material for filling teeth, there are very few who use it in practice. The fillings exhibited were made out of the mouth, but the same thing can be done in the mouth, provided the same faithfulness and perseverance are used that we employ in gold. Tin foil will stand attrition, not equally with gold, but much better than most people suppose. Why is it not used more? It can only be for one of three reasons: ignorance, indolence, or cupidity. Most dentists use amalgam in place of it, but there is nothing in common between them; the one is a plastic material which must undergo a crystallization in the cavity, which of course brings with it a change of form and adaptation, while the other is a pure metal which undergoes no change after insertion. When plastics are used, there must be either a shrinkage or an expansion. Hence I am not, as a general rule, in favor of those materials, because I never know what will be the final adaptation of the filling. I have written and spoken upon the subject repeatedly, and I claim to be consistent when I urge the use of tin foil, because I employ it almost every day.

Dr. E. T. Darby. I have only a word to say about the tin shavings, and the tin wheel from which they were turned.

An ordinary corundum wheel, one-half inch thick and two inches in diameter, was used as the model, that was molded in sand. The tin was melted in a ladle and poured into the sand, after which a hole was drilled in the center of it, so that it could be mounted on an arbor and turned in the lathe. A chisel in the slide rest was used as the tool, and these shavings were turned off of the thickness desired.

Pure tin freshly cut from the wheel in the form of shavings is quite cohesive, and, as you have seen, packs beautifully.

When tin and gold foil are combined in the same filling, I think there should be at least two leaves of gold to one of tin. My habit is to put one leaf of No. 4 tin between two leaves of No. 5 soft gold foil, then fold it and cut into narrow pieces.

I am not particular what kind of an instrument I use to pack the tin with. An ordinary excavator with the point dulled or broken is as good as anything. The tin is so cohesive that it works as well as cohesive gold foil.

Dr. F. T. Van Woert. I think the Second District Society has reason to feel proud of the last two meetings. It is a long time since we have seen so many gentlemen from both New York and Philadelphia among us at one meeting, and I think before we adjourn we should render them a vote of thanks for turning out so nobly and helping us make successful meetings, and I move you that the essayist and visiting gentlemen be tendered the thanks of this society.

PHILADELPHIA COUNTY MEDICAL SOCIETY.

At a meeting of the Philadelphia County Medical Society, held February 14, 1894, a paper by Drs. W. W. Keen and John K. Mitchell, of Philadelphia, on "An Operation for the Removal of the Gasserian Ganglion," was read by Dr. Mitchell. The initial section in the case was performed with the circular saw of the new surgical engine, related by Dr. Keen as follows :

"Dr. M. H. Cryer, with the new surgical engine of The S. S. White Dental Mfg. Co., and a circular saw, one and one-half inches, with a guard, rapidly and very successfully divided the external table, excepting at the two extremities. Here, fearing perforation before the inner table and the rest were divided, I determined to chisel through," etc.

Dr. Cryer described the surgical engine referred to in the paper and demonstrated its use. He said,—

This is the instrument which Dr. Keen used in the operation which has been described. The engine is comparatively a new one, having been made this summer, and it embodies some suggestions of my own to give more power and speed. The engines which we have had have been liable to choke and clog in the work. Dr. Keen speaks as though the instrument did not cut rapidly. I had the idea that it did cut rapidly. This is the saw which was used on that occasion. It is provided with a guard which is set by two screws, and the depth to which the saw cuts can in this way be regulated. The difficulty is that the skull varies in thickness, not only in different subjects, but in individual cases. In the case reported, I cut through the external table with the saw, and the inner table was then broken with the chisel. If we were to cut through both tables with this saw, there would be danger of wounding the dura mater.

In order to overcome this objection, I have since devised the spiral osteotome, having three cutting blades, and each blade having a spiral thread upon it, forty-four to the inch. There is at the end of the instrument a small button, which is passed through a five-sixteenths trephine opening into the cranial cavity, and serves to keep the osteotome in place. The button slides between the dura and the skull. In this way I am able to cut the bone very rapidly without any danger of injuring the dura, regardless of the thickness of the skull. I have worked by the hour on the cadaver, and have never cut the dura except in one case, and there examination showed the dura to be adherent to the skull.

I have constructed similar instruments for work in other situations, as in the nasal cavity. In this way the inferior turbinated bone or projections of bone can be readily removed.

Dr. John B. Roberts. With regard to this elaborate instrument, it seems to work very satisfactorily, yet for my own work I should rather use a sharp chisel with my own hand and my own mallet than any mechanical device. These are apt to get out of order, and must be at some place where they can be kept in order. What we want to do is to train our hands to do the work, and not be dependent upon any mechanical device. The patient whom I shall show was operated on with great satisfaction with a small chisel,—not the large chisel that you find in the operating cases for large bones, but such a chisel as you would use for delicate work. I am getting more and more in the habit of using the chisel than the trephine, and am coming to look on the trephine as a little old-fashioned. The corner of a very sharp chisel answers very satisfactorily.

Dr. Keen. The division of the skull by Dr. Cryer with the surgical engine was only moderately satisfactory as to speed. Since then I have had made, at the instance of Dr. E. T. Darby, a drill with two spiral threads, which answers the purpose very much better, on account of the rapidity with which it divides the bone. Dr. Cryer (*Med. News*, January 6, 1894, and DENTAL COSMOS, January, 1894) has figured another drill which he says will work more rapidly, but with which I have had no experience. The diagram seems to me to point toward a successful instrument.

WOMAN'S DENTAL ASSOCIATION OF THE UNITED STATES.

THE regular monthly meeting of the Woman's Dental Association was held February 3, 1894, at 1308 Walnut street, Philadelphia; the president, Dr. Mary H. Stilwell, in the chair.

In the absence of the essayist, Dr. Alice I. Ireland, her paper was read by the corresponding secretary, Dr. Annie T. Focht. Subject of paper, "Food in its Relation to the Teeth."

The next meeting will be held March 3, 1894, at 1300 Arch street, Philadelphia. It will be the yearly business meeting.

ELIZA YERKES, *Recording Secretary*,
4004 Chestnut street, Philadelphia.

DENTAL SOCIETY ANNOUNCEMENTS.

SOUTHERN DENTAL ASSOCIATION.

BY decision of the Executive Committee, the next meeting of the Southern Dental Association will be held at Old Point Comfort, Va., the last Tuesday (the 31st) of July, 1894.

S. W. FOSTER, D.D.S., *Rec. Sec.*, Decatur, Ala.

TENNESSEE STATE DENTAL ASSOCIATION.

THE twenty-eighth annual meeting of the Tennessee State Dental Association will convene in Nashville, March 27–30, 1894. All dentists in good standing will receive a warm welcome.

W. W. JONES, *Rec. Sec.*, Murfreesboro, Tenn.

ALABAMA DENTAL ASSOCIATION.

OWING to the burning of one of the principal hotels in Troy, the Executive Committee of the Alabama Dental Association have deemed it advisable to change the place of their next annual meeting from Troy to Montgomery, Alabama, April 10 to 13, 1894, inclusive. Everything is being done to make it an enthusiastic and profitable meeting. All reputable dentists are most cordially invited to attend.

S. W. FOSTER, D.D.S., *Secretary*, Decatur, Ala.

VERMONT STATE DENTAL SOCIETY.

THE eighteenth annual meeting of the Vermont State Dental Society will be held at White River Junction, Vt., March 21–23, 1894.

A cordial invitation is extended to all members of the profession.

THOMAS MOUND, *Secretary*, Rutland, Vt.

NORTH DAKOTA DENTAL ASSOCIATION.

THE twelfth annual meeting of the North Dakota Dental Association will be held at Grand Forks, June 20, 21, and 22, 1894. A cordial invitation is extended to all members of the profession.

R. B. FOSTER, *Secretary*, Grand Forks, N. D.

EDITORIAL.

DENTAL SOCIETY DISCUSSIONS.

To even a superficial observer of such matters it must be evident that the average dental society discussion falls very far short of what it might be when judged from the standpoint of its educational possibilities. It is presumed that the object of these associations is essentially educational, and that papers are read and discussions had thereon to the end that members may be mutually benefited intellectually. It is frequently remarked, and no doubt justly, by those who habitually attend dental meetings, that one can always learn something, pick up at least one valuable point at any dental meeting, even if one has to listen to an almost endless amount of talk of little interest and less value in order to gain the one point of usefulness. But why should so much that is worthless be allowed to obstruct and obscure that which after all is the sole reason for the holding of these meetings?

It would seem that the fault, or at least a portion of it, may be fairly charged to the members themselves, and a certain amount to the presiding officer. In the conduct of that portion of the meeting devoted to the transaction of routine business, the strictest rules of parliamentary or congressional usage are generally adhered to. This is as it should be, for experience has shown that any departure from such methods immediately gives rise to disorder, and at once constitutes a formidable impediment to the transacting of the society's business. The best business meetings are those in which the deliberations are rigidly controlled by established rules of order intelligently administered by the presiding officer, whereby work is facilitated and efficient legislative action is achieved.

While our dental societies are not above criticism in this respect, and there is still room for improvement in the matter of a better understanding of the rules of parliamentary procedure, the greatest defect is not here, but is related to the matter of literary and scientific discussion in these bodies. While a society may err in the letter, it rarely if ever is intentionally wrong in carrying out the spirit of the laws governing its routine business deliberations. Any infraction of these is at once dealt with ; both presiding officer and members cooperate to that end. When, however, the reading of the formal essay or the announcement of a special topic for discussion becomes the regular order, a totally different spirit seems to animate the meeting, so far as its governmental factor is concerned. The widest latitude of discussion is permitted, extraneous matter is freely admitted, so that by the time the discussion is somewhat advanced it often bears absolutely no immediate relation to the subject which is the regular order. Thus it happens that a paper on dental histology will sometimes provoke a discussion upon the best methods of root-filling, or one on implantation of teeth a discussion upon the relative merits of cohesive and non-cohesive foils for filling cavities of decay.

This is not as it should be. If it be true that a dental society is organized for the mutual improvement of its members, then it is the duty of those connected with it to see that its object is obtained in an orderly way by the most effective methods. In the conduct of its routine business the end is obtained by the enforcement of rules of order as noted. The society's educational work is certainly a portion of its business, as important, if not more so, than any other, and when it becomes the regular order, should be treated and governed upon the same principles. For example, it is everywhere admitted that the consideration of a motion is out of order while deliberation upon a previous one is pending. In like manner the introduction of irrelevant matter during the discussion of a formal paper or topic which is the regular order should under no circumstances be permitted, as it divides attention and defeats the ends of the original discussion.

Any subject submitted to a dental society for its deliberation is essentially put on trial for its accuracy, the object of discussion being the attainment of truth or a knowledge of the facts involved or related to it. Those taking part in the discussion contribute to the desired end by submitting each their quota of testimony. The conditions, though of course modified by the circumstances, are essentially those upon which causes are tried in legal courts, and the same principles should, with proper modifications, govern them. The recognition and application of these principles would secure several desirable and much-needed improvements in the results of our dental society work. It would eliminate the possibility of introducing extraneous and irrelevant matter into discussions. The introduction of such, however valuable the matter may be in itself, becomes obstructive to the object and demoralizing to the continuity of a discussion, which degenerates into a mere experience meeting savoring too strongly of the Dorcas Society. It would also secure what is most needed, and what is conspicuously absent from nearly all reports of dental society proceedings, namely: a careful and clear summing up of the discussion, so that definite conclusions may be drawn from the evidence which has been adduced.

How often does it happen that one carries away from a dental meeting any clear concept of what has been actually accomplished by the discussion? A rather incoherent idea of the opinions of individual members upon the subject may remain, with sometimes a disagreeable impression of the personal antagonisms which may have arisen; whereas if the author, or even some one else, in closing the discussion had made a *resumé* of the vital points presented, and shown their value and especial bearing upon the formal question at issue, each hearer would have received a clear impression of the merits of the case, and perhaps have retained them to his benefit.

It is not to be inferred that all dental meetings are thus open to criticism, nor that the remedy here suggested is in all cases sufficient; but one cannot avoid the conclusion, from a general survey of dental society reports, that in many cases their character would be more elevated and their value enhanced if the educational function of the dental society were recognized as its essential *raison d'être*, and the principles of parliamentary usage were applied to their scientific discussions with the same inflexibility as they usually are to the conduct of routine business.

In our issue for January we made use of the term "formerly" in referring to the Secretary-General of the World's Columbian Dental Congress. This grew out of an impression that the official organization of the Congress ceased with its holding. We have since learned this to be a mistake, and the use of the word "formerly" in connection with the Secretary-General is therefore an error. We gladly make the correction, with our apologies to Dr. Harlan for the mistake.

BIBLIOGRAPHICAL.

THE NATIONAL DISPENSATORY. Containing the Natural History, Chemistry, Pharmacy, Actions and Uses of Medicines, including those recognized in the Pharmacopœias of the United States, Great Britain, and Germany, with numerous References to the French Codex. By ALFRED STILLÉ, M.D., LL.D., Professor Emeritus of the Theory and Practice of Medicine and of Clinical Medicine in the University of Pennsylvania; JOHN M. MAISCH, Ph.M., Phar.D., late Professor of Materia Medica and Botany in Philadelphia College of Pharmacy, Secretary to the American Pharmaceutical Association; CHARLES CASPARI, JR., Ph.G., Professor of Pharmacy in the Maryland College of Pharmacy, Baltimore, and HENRY C. C. MAISCH, Ph.G., Ph.D. New (fifth) edition thoroughly revised, according to the new United States Pharmacopœia (7th Decennial Revision, 1894). In one magnificent imperial octavo volume of 1910 pages, with 320 elaborate engravings. Cloth, $7.25; leather, $8.00. With Ready Reference Thumb-letter Index, cloth, $7.75; leather, $8.50.

This is truly a wonderful book, so full and comprehensive within the limits of its field that no adequate idea of its value can be had short of a careful and elaborate study and use of it as a work of reference. Five editions of the National Dispensatory have been issued since its first appearance fifteen years ago, so that the authors and editors have been enabled to keep it fully abreast with the progress of its various departments.

The present edition embodies more numerous changes and additions than any of its predecessors; these have been largely caused by the introduction of many new synthetic remedies which have been the outgrowth of chemical research in this line, and largely also to the sweeping changes made in the recent official revision of the United States Pharmacopœia, all of which have been incorporated. The latest editions of foreign pharmacopœias have been drawn upon, and all material of value which they could furnish has been included in the present edition of the National Dispensatory.

From the chemical and pharmaceutical standpoint perhaps nothing further could be desired in the work; the sources, natural history, methods of preparation, chemical composition, tests, properties, and uses of drugs as medicine are fully and accurately given. The therapeutical phase of the subject appears to be largely subordinated to the chemical and pharmaceutical. The author in charge of the therapeutic section of the work, as announced in the preface, has adopted the empirical method in the treatment of his subject, in contradistinction to what he terms the "dogmatic method," by which he means that he has relied solely upon the results of clinical study of drugs, and dismissed from consideration any of the data deduced from the study of chemical composition or physiological experiment. Hence we are somewhat disappointed in the study of certain substances, for example carbolic acid, iodoform, sublimate, etc., for which germicidal action is or has been claimed, to find but meagre information upon their relative antiseptic value and uses as germicides. It is no doubt true that too much emphasis has been given to the "dogmatic"—*i.e.*, physiological and chemical constitution—factors in determining the therapeutic application of drugs, but to dismiss as unworthy of consideration a method of study which has yielded so much of accurate knowledge in the case of some of our best-known drugs seems to savor also of dogmatism, to some degree at least.

The substances having a special dental interest are fully treated, with a few minor exceptions. Trichloracetic acid is fully described from the chemical standpoint, but no mention of its therapeutic uses is made ; this is likewise true of aristol. Cinnamon oil and cinnamic acid are treated at length, but their use as germicides and antiseptics is not alluded to. Arsenious acid is spelled also arsenous. We find no allusion to tropacocain, but under cocain it is described under its chemical name as benzoyl-pseudo-tropeine, though neither this name nor tropacocain appears in the index.

The articles upon thymol, creasote, carbolic acid, iodoform, corrosive sublimate, and a number of other drugs used in dental practice are remarkably comprehensive and interesting. We know of no work that embraces so much territory in this field and which covers it so accurately and well as this one. It will be invaluable as a reference-book for all who are called upon to intelligently make use of drugs as medicines.

THE PHYSICIAN'S WIFE, AND THE THINGS THAT PERTAIN TO HER LIFE. By ELLEN M. FIREBAUGH. With portrait of author and 44 photo-engravings of original sketches. Crown octavo, pp. 200. Extra cloth, $1.25 net. Philadelphia: The F. A. Davis Co., publishers, 1894. Special limited edition, first 500 copies, numbered, and printed in photogravure ink on extra fine enameled paper, bound in half leather and vellum cloth, $3.00 net.

A charming story delightfully told, replete with incident, both humorous and at times pathetic, along with a philosophical or introspective flavor which reveals a sympathetic nature ; a natural trait, perhaps, but certainly bearing the evidence of having been developed by contact with the busy life of her husband in caring for the ills of that portion of humanity within their scope. We know much of the details of the physician's life, its struggles, its failures, its emoluments, rewards, and successes,—but this bit of their life, as seen and told by his wife, is as novel as it is interesting and refreshing.

POPULAR ESSAYS UPON THE CARE OF THE TEETH AND MOUTH. By VICTOR C. BELL, A.B., D.D.S. 12mo, pp. 103. Published by the author, 1894. Price, cloth, $1.25.

Under this title we have a hundred pages devoted to the exposition in popular style of useful knowledge pertaining to dentistry ; useful to the lay reader, and at the same time furnishing the dental practitioner with not a few valuable hints as to his relations with types of patients. Certainly the work of many would be rendered lighter were the information contained in this small volume acquired by patients. It is a step in the right direction, leading toward the education of the public in matters dental. Not the least service to be derived from such a work is the cure of some of the bickering which at times annoys the professional man. Every dentist should have a copy upon the table in his reception-room. It will save many times its cost by the clearness and satisfactory manner in which it answers the many questions continually submitted to the operator for solution by his patients.

PAMPHLETS RECEIVED.

Transactions of the California State Dental Association, at the Twenty-fourth Annual Session, held at San Francisco, commencing June 13, 1893.

Cleft of the Hard and Soft Palates. By J. Ewing Mears, M.D. Read before the Philadelphia Academy of Surgery, November 6, 1893.

Naso- or Retro-Pharyngeal Growths. By J. Ewing Mears, M.D. Reprinted from the Transactions of the American Surgical Association, 1893.

The Teeth during Pregnancy. By A. Hugh Hipple, L.D.S., D.D.S., Omaha, Neb. Reprinted from the *Medical Standard.*

Modern Homeopathy ; Its Absurdities and Inconsistencies. By William W. Browning, A.B., LL.B., M.D. Prize Essay. Philadelphia, 1894.

OBITUARY.

DR. SAMUEL WARDLE.

DIED, at his country home near Hartwell, Hamilton county, Ohio, on January 24, 1894, SAMUEL WARDLE, D.D.S., in the seventy-second year of his age.

Dr. Wardle, so long a prominent dentist of Cincinnati, was born in Leicester, England, in 1822, and came to America in 1832. After working on a farm for five years, he became an apprentice to a silversmith in Philadelphia, working at that vocation for about three years, after which he made a voyage at sea on a whaler, which doubled Cape Horn and went to the sea of Kamschatka, and finally entered the harbor of San Francisco in 1843. He returned with his ship to New London, Conn., and was soon again in Philadelphia, where he began the study of dentistry under the tutelage of Dr. Elisha Neall. After two years he entered the office of his brother, the late Dr. Thomas Wardle, and remained for some time, when he opened an office and mechanical laboratory, in which were carved some of the first teeth sold by the late S. S. White.

In 1852 Dr. Wardle went to Cincinnati, Ohio, and on leaving Philadelphia he was presented with a gold medal by fourteen of the most prominent dentists of the city, as "a token of his skill in mechanical dentistry." He established a dental furnishing house, and manufactured artificial teeth; but not meeting with success in that line, he resumed his profession for a livelihood. In 1859 he received a diploma from the Ohio College of Dental Surgery. He carved many of the teeth used in his practice, and also those for peculiar and difficult cases taken in charge by other dentists. Some idea of the standing and reputation of his work may be gained from the fact that his artificial teeth secured the first premium yearly from the Cincinnati Industrial Exhibition, also premiums at Baltimore, Philadelphia, and New York, and in 1851 a medal from the World's Fair in London, England.

Dr. Wardle was an active member and officer of the Mississippi Valley Dental Association, and an honorary member of the Pennsylvania Association of Dental Surgeons. We often feel a legitimate pride in the fact which we may state of him, as of others of these early and successful dentists, that he was one of the first subscribers to the *Dental News Letter*, and long a continuous subscriber to its successor, the DENTAL COSMOS. He was a genial, warm-hearted, and generous man, and often gave gratuitous services to those in need, as well as counsel and encouragement, not only to young men, but to women entering the profession. His memory is tenderly cherished by those who profited by his precepts, as well as by many relatives and friends in and out of the profession. His remains were interred at Spring Grove.

DR. EDWARD WILLIAMS.

DIED, at his residence, No. 52 Roger avenue, Lynn, Massachusetts, December 11, 1893, of general tuberculosis, Dr. EDWARD WILLIAMS, aged thirty-four years.

Dr. Williams was born of Welsh parents, in Newtown, Montgomeryshire, Wales, June 13, 1859. When quite young his father moved to America. He received his early education in the public schools of North Adams, afterward studying dentistry in the office of his brother, Dr. Thomas Williams, of Olneyville, R. I., where he also practiced for a time. In 1882 he became associated with Edwin Frizzell, D.D.S., and opened an office in Lynn, Mass. On the death of Dr. Frizzell, he succeeded to the joint practice. In 1888 he became associated, for a short time, in practice with M. C. Smith, D.D.S., M.D., but soon gave up the practice of dentistry altogether, on account of failing health. Upon regaining his health, he opened another office in Lynn, where he continued to practice until his last illness.

In 1884 he married Annie E. Smith. He leaves a widow and two children to mourn the loss of a kind husband and a devoted father.

RESOLUTIONS OF RESPECT.

THE New England Dental Society has recently passed the following resolutions of respect to deceased members:

DR. EDWARD N. HARRIS.

WHEREAS, It has pleased God to remove from our midst our late brother and fellow-worker, Dr. Edward N. Harris, of Boston;

Resolved, That we deeply feel his loss in this society, and deplore his removal from its ranks;

Resolved, That we extend to his family our sincere sympathy in their affliction, and commend them to Him who doeth all things well.

Signed by Edgar O. Kinsman, Stephen G. Stevens, and G. A. Young, committee.

DR. CHARLES H. OSGOOD.

WHEREAS, The death of Charles H. Osgood removes from our society and the profession one who was ever zealous for their best interests; one who, while health permitted, was ever active and earnest for the good of this society and his chosen calling; therefore be it

Resolved, That on this occasion we deem it appropriate to express our regrets at his removal, which we deem a loss not only to ourselves, but to the profession at large;

We hereby express our appreciation of his many excellent qualities both as a man and as a dentist, and our sympathies are hereby extended to his sorrowing family.

Signed by Stephen G. Stevens, G. A. Young, and Edgar O. Kinsman, committee.

DR. JOSEPH GUTTMAN.

WHEREAS, It has pleased God to remove our friend and brother, Joseph Guttman, from his friends and the profession; therefore be it

Resolved, That while we bow with humble submission to the will of the Most High, we do not the less mourn for our brother, whom we loved as a man and as a dentist;

Resolved, That this society laments the loss of one who was ever ready to do his duty in the society and his profession, and that it is but a just tribute to the memory of the departed to say that we deem it not only a loss to ourselves, but also to the profession;

Resolved, That we sincerely condole with the family of the deceased on the dispensation with which it has pleased Divine Providence to afflict them, and commend them for consolation to Him who orders all things for the best and whose chastisements are meant in mercy;

Resolved, That this heartfelt testimony of our sympathy and sorrow be forwarded to the family.

Signed by G. A. Young, Edgar O. Kinsman, and Stephen G. Stevens, committee.

PERISCOPE.

AS OTHERS SOMETIMES SEE US.—Can nothing be done to restrain the dentists in their persistent desire to remove teeth and insert false sets in defiance of common sense, justice, and health? I have had several young ladies under my care who have needlessly suffered the extraction of their upper teeth and the substitution of the abominable "false set."

In the first place the etherization and the operation of removing the decayed teeth, stumps, etc., makes a serious impress on the constitution. Anæmia, cephalalgia, leucorrhœa, and neurasthenia have frequently come under my care from such a cause. Men, as well as women, suffer severely from the dentist's operations, and will remain for days and even for weeks under treatment to "get over the effects" of the severe injury to the general health.

But after the "false set" of teeth has been placed in position, then the troubles begin. Comparatively few patients remove the plate at night upon going to bed, or if they do so, neglect to give it the thorough disinfection it requires. The action of the teeth-plate upon the secretions of the mouth induces such unwholesome fluids to collect that considerable serious injury is rapidly induced. The mucous membrane of the nares is at once injured, the eyes, nose, ear, and sense of taste are speedily injured, the stomach and bowels soon receive injurious influences, and the general health is decidedly impaired. The nervous system is rapidly influenced, and the youth and health of the girl or boy is permanently attacked. All these evils have come through ignorant dentistry. The newspapers are filled with advertisements making inducements for people to have false teeth put in at very low rates. Our country people are peculiarly susceptible to these offers, and are the victims of all kinds of charlatans. It does seem as if the subject were of sufficient importance medically and legally to attract more general attention.—*W. Thornton Parker, M.D., in N. Y. Med. Times.*

ADVERTISING BY DENTISTS.—The General Medical Council of Great Britain have taken a step in regard to advertising by dentists. At the meeting recently held, Mr. Brudenell Carter submitted a motion, which Sir Dyce Duckworth seconded, declaring that while the council would "not at present interfere with the practice so long as it is confined to a mere notification of the place of abode and the profession of the advertiser, yet that the publication of a scale of charges, or the issue of advertisements containing claims of superiority over other practitioners, or unfair depreciation of them, will be regarded as an offence with which the council will be prepared to deal, and which may easily be carried so far as to constitute infamous or disgraceful conduct in a professional respect." The council agreed to remit the motion to the executive committee in order to get legal opinion before sending out a notice in such terms to registered dentists.—*Chemist and Druggist.*

SECTIONAL ARRANGEMENT OF THE WORLD'S COLUMBIAN DENTAL CONGRESS.—The sectional arrangement gave rise to considerable criticism, both then and since. With a plethora of material and a limited time of meeting, any other arrangement would have been infeasible. Simply because of "the impossibility of dividing one's personality into eight sections," it is absurd to conclude that "very little of real scientific value" was accomplished. . . .

That is one of the disadvantages of development; our prehensile faculties as it were do not increase with our opportunities of acquiring knowledge, and perhaps happily so. In the choice of a section, as in other things, we must learn to exercise a wise discretion. Moreover, many an essayist prefers to read his paper before a smaller audience of those who take a warm interest in the subject rather than in the presence of a larger one where the majority are cold and apathetic. Many contributions are of general; many, and some of these of the best, are only of special interest. The combination of general with sectional meetings provides the most satisfactory method of doing adequate justice to both.

The contrast between the discussions at the general meetings and those in the sections was most marked, for the latter were bright, lively, and well sustained, as the former were dull, dead, and infrequent. "Magnetism in numbers!" Yes, indeed, in matters of great political or social interest, but not in science. Quality predominates over quantity, mind over numbers. Far from regretting the "unified" arrangement of the Oral Section of the International Medical Congress at Washington, I regard the general and sectional arrangement of the World's Columbian Dental Congress as a very marked sign of progress, already attained and accepted by other kindred organizations.—*George Cunningham, in the Dental Record* [*London*].

THE DANGERS OF HYPNOTISM.—In his opening address to the medical students at the University of Edinburgh, Professor Grainger Stewart particularly directed the attention of the students to the following remarks: (1) that the hypnotic conditions of all varieties were practically a diseased state of the nervous system, an artificial neurosis; (2) that hypnotism was undoubtedly able to modify certain morbid processes of the nervous system, particularly those of a functional kind; (3) that in certain conditions results undoubtedly favorable, at least for the time, had been obtained by hypnotic treatment;

but (4) that in every case hypnotic treatment involved hazard to the nervous system, that those who were most susceptible to its influence were the most apt to suffer, and that though it might free the patient from one set of symptoms it was apt to make him the victim of many others. Therefore he recommended the students to employ hypnotism very rarely, to a very moderate extent, and only after careful study of the patient's condition.—*Lancet.*

DENTITION AND SOME OF ITS DISEASES.—Normal dentition is comparatively harmless. The teething in wild animals and barbarous nations is usually attended with no danger, and but little inconvenience. The young, however, of beasts confined in cages rarely live during the period of teething.

In our age of civilized refinement, abnormal dentition is the rule. So deadly has it become, that one-third of the human family die before the twenty deciduous teeth have fully appeared. Its danger is constantly increasing. A few decades ago, when the practice of mothers nursing their children was more in vogue, the fatality was not nearly so great. Latterly it has become unfashionable, and children are fed on artificial food, and the result is an alarming mortality. Dentition in these children develops incidentally many diseases. The commonest are irritative fever, indigestion,—with its attendant evils, flatulency, constipation, and diarrhœa,—cerebral convulsions, stomatitis, capillary bronchitis, and pneumonia. Practically, it is almost impossible to, at times, segregate the foregoing diseases. Clinically one or most of them may be present, in the cutting of a single tooth. Irritative fever is the most frequent. The gums, irritated by the advancing tooth, generate a poisonous mucus, the salivary glands become abnormally active, and a rise in temperature appears. This saliva is swallowed, and interferes with the digestion of food, that otherwise even would be difficult to assimilate. Flatulency, constipation, or its opposite, diarrhœa, are evils now present This now poisonous ingesta may produce, through reflex sympathy, cerebral convulsions.

In childhood, the nervous system so preponderates that any irritant will readily disturb the delicately balanced equipoise. Adults, with nerves trained to pain and suffering, know how toothache will derange the entire nerve-system, and even increase a degree or two the body temperature.

The infantile tooth gradually rising through the gums, producing continuous tension, develops varied forms of constitutional as well as local disturbances. The mucous membrane becomes red, hot, swollen, and tender. The saliva is greatly increased, and the itching over the protruding tooth is so annoying that to allay it the child tries to bite everything that comes in its way. A nervous or irritative fever now appears. The temperature will often rise to 104 or even 105 degrees, when eclampsia may come on. Though "teething convulsions" have been denied by a few modern medical writers, yet their existence has so often been corroborated by clinical experience, their etiology cannot be gainsaid. During the coma of these convulsions, capillary bronchitis may arise as a complication, and when it does it is often fatal.

Purulent conjunctivitis has often been found during the time the upper cuspids are being cut. In this case, inflammatory action is transmitted through the antrum of Highmore. During dentition, eclampsia is very common, as well as fatal, in the children of drunkards, who also are more liable to gingivitis and the different forms of stomatitis.

Coughs often accompany the appearance of the upper teeth, which resist medical treatment until after the teeth have fully appeared. Exanthemata, especially eczema impetiginosum, may occur at this period, which stubbornly resist treatment,—and fortunately they do, for if cured dangerous cerebral complications would present themselves, the skin-disease forming as it were a safety-valve.

During the teeth-evolution the submaxillary glands are often swollen, and I have often seen the cervical glands enlarged and suppurating, especially in children of scrofulous or rachitic parentage.

The treatment for all these diseases should be anticipated, and prophylactic. The time-worn saw of "an ounce of prevention" is especially applicable here. Dentition is a dangerous period in a child's life, and should be jealously watched by mother and physician. Conditions, hygienic and dietetic, should be most propitious.

Every unfavorable complication should be met at the threshold, and if possible mastered. Diarrhœa, so common, is a safeguard in expelling from the system morbid material, and should not suddenly be checked. Paregoric, so usually administered by the laity at this time, often works irremediable mischief in the stoppage of the flux which nature has wisely instituted for the benefit of the child. Should it become chronic and weakening, it then should receive the physician's attention. Usually, minute doses of hydrargyrum cum creta, bicarbonate of soda, and tannin for a day or two, followed by oil, will rectify the trouble. Excessive temperature should at once be controlled by baths, lessening the food, enemas, and aconite. Cutaneous affections should receive no attention during this period. Capillary bronchitis, pneumonia, and other diseases of the respiratory organs, should be treated as indicated, but prevented if possible. Restlessness can often be overcome by hot baths, with aconite and the bromids. If the tooth is just breaking through the gums, lancing it will often afford prompt relief. Delayed dentition in young children may be remedied by vigorous constitutional treatment of pure air, wholesome food, bathing, cod-liver oil, and citrate of iron and quinin.—*Dr. Marion Thrasher, in Journ. Amer. Med. Assoc.*

DROPS *vs.* MINIMS.—The terms *gtt.* and *m.* are often used synonymously and interchangeably when in many instances there is a wide difference between them.

A *drop* is usually considered a *minim*, or one-sixtieth part of a fluidrachm. This is true of water and some other liquids ; yet drops of the same liquid vary under different circumstances.

Let us enumerate a few of the things that modify the size of drops. Specific gravity is one. The heavier the liquid the smaller the drop, and the greater the number in a given measure. For instance, a drop of chloroform, which is a very heavy liquid, is small ; smaller than one of ether or alcohol. Again, the shape of bottle, or other container, modifies the size of the drops ; those from a thick-lipped bottle being larger than those from one with thin lips. The broader the surface from which drops fall, the greater their size. Drops from a full bottle are usually smaller than from a bottle partially emptied, owing to rapidity of movement.

Viscidity, or adhesiveness of the liquid to the sides of the bottle, requiring, as it does, a greater mass to overcome it, augments the size of the drop.

The greater the mobility of a liquid, the larger the drop.

In measuring liquids by drops, it is best to use a glass medicine-dropper, and not depend upon the uncertainty of dropping from various-shaped bottles.

The following list will serve the purpose of showing the relative difference between drops and minims of a few of the drugs employed by the dentist :

Number of Drops in Sixty Minims.

Carbolic acid	111	Oil cloves	130
Sulfuric acid	128	" cinnamon	126
" " dilute	60	" wintergreen	125
Aromatic sulfuric acid	146	" menth. pip.	129
Ether	172	" sassafras	133
Alcohol	146	" terebinthinæ	136
" dilute	137	Aromatic spirits of ammonia	142
Aqua dest.	60	Spirits camphor	143
" ammonia	64	Syrups	65
Chloroform (purified)	250	Tinct. aconite	146
Creasote	122	" benzoin comp.	148
Fl. extract ergot	133	" digitalis	128
Glycerin	67	" chlorid of iron	150
Liq. chlorid of zinc	89	" opii	130
Oil cajuput	134	Vin. opii	100

—*Ohio Dental Journal.*

DENTAL CAUSES OF EARACHE.—Omitting many of the rarer causes of earache, we come finally to the teeth as causes of otalgia. The eruption of either the milk or the permanent teeth in children may cause earache, which can be relieved by treating the gums. In adults the growth of the third molars may cause similar trouble. Diseased teeth, improperly treated, or retained in the jaw when dead, by the dentist's art, may cause severe earache. Cure here is to be sought by removal of the offending members, in spite of the protest of prosthetic dentistry.—*J. A. Thompson, M D., in Cincinnati Lancet-Clinic.*

SALIVARY CALCULI.—Salivary calculi in their more usual situation near the buccal end of Wharton's and Steno's duct are very easily recognized; their situation, their very definite figure, and their significant hardness—all of which are readily appreciated through the buccal mucosa—together establish a very high degree of probability of the true nature of the little knot they occasion; and the fluxionary swelling of the gland which they in many instances provoke affords additional proof. Their figure is usually fusiform or oval, and their size small, the length of their longer axis seldom exceeding one centimeter. They occur more often in connection with the submaxillary than with the parotid gland, a circumstance not improbably dependent on differences in the constitution of the secretion yielded by these two glands. The secretion of the parotid gland is quite limpid, whereas that of the submaxillary gland is glairy, owing to the presence in it of much mucin, a substance which seems to possess considerable binding qualities and to favor the agglomeration of solidifying inorganic salts, like the acacia gum-water used by Messrs. Rainey and Ord in their instructive experiments on the artificial production of concretions. Of the originating causes of the formation of salivary calculi there is little certain knowledge. The precipitation and accretion of urinary salts around foreign bodies detained in the urinary bladder—a circumstance with which all are familiar—have suggested a like origin for salivary calculi. Their very common situation within the main salivary ducts near the opening of those in the buccal mucosa, through which it is imaginable that minute foreign bodies may enter, favors this hypothesis; besides, it is well known that in a few instances the presence of a foreign nucleus within a salivary calculus has been actually verified. Perhaps, were a search always made for such a nucleus, its presence would be more frequently verified.—*J. W. Hulke, F.R.S., in Lancet.*

THE INFLUENCE OF SALIVA ON THE GASTRIC MOTOR AND SECRETORY FUNCTIONS.—The influence of each secretion on the others with which it comes in contact is a phase of the digestive processes that heretofore has received too little attention from physiologists in general. Biernacki (*Ztschr. f. klin. Med.*, xxi, p. 97), however, has recently repeated and extended the observations of Sticker on the service of saliva in the stomach processes. A test meal was taken, consisting of a starch mixture and white of egg with water, followed immediately by potassium iodid. All was taken both with and without saliva, in the former case the saliva of the mouth being allowed to enter the stomach in the usual way, while in the latter care was taken, not only in introducing the food, but also during digestion, that no saliva whatever passed into the stomach. At the end of thirty minutes, the stomach contents were removed and tested to determine the total acidity, the amount of hydrochloric acid, the presence of free hydrochloric acid, the peptic digestive activity, and the presence of iodin. The result of the admixture of saliva was a diminution of the volume of gastric contents; an increase of absorption as shown by the disappearance of iodin, otherwise present; a very considerable increase of the total acidity; a marked increase in the percentage of hydrochloric acid present; and the presence of free hydrochloric acid which the parallel digestions without saliva did not contain. Hence the author concludes that, if the food is introduced through the mouth with admixture of saliva, the motor and secretory activities are greater than when it is introduced through a tube, thereby preventing both the admixture of saliva and even its presence in the stomach.

It may be questioned how saliva acts in producing this favorable influence on the gastric functions,—whether directly or through changes in the food. Perhaps the first explanation to suggest itself is that the saliva has a direct stimulating action in virtue of its alkalinity; but observation has disproved this view. Experiments with weakly alkaline, neutral, and acid test meals showed that neutral or slightly acid food acted more favorably to these gastric functions than alkaline. On the other hand, when a large quantity (45 c. cm.) of normal saliva was mixed with the test meal the same favorable influence was noted as though the food had been taken with saliva through the mouth, or had been made neutral or faintly acid. That in the case of admixture with alkaline saliva the favorable influence was not due to the presence of ptyalin was shown by the fact that the alkaline saliva acted in precisely the same way when previously heated to 85° C. for five minutes. Evidently, therefore, since neither the ferment nor alkalinity of the saliva is the direct cause of the increase in gastric activities, some change in the food is brought about, a change in which the ptyalin is not concerned; and this changed food produces the favorable influence on the motor and secretory processes of the stomach. It was found, if the test meal was held in the mouth in small portions and then introduced all at one time through the tube into the stomach, that this organ was stimulated more constantly and to a greater degree than when the saliva was directly mixed with the meal and administered through the tube as already described. A careful examination revealed the surprising fact that when the slightly alkaline test meal was held in the mouth, the chemical reaction was changed, becoming neutral or even faintly acid. Hence it is evident that the test meals taken with saliva, having been rendered neutral or faintly acid in the mouth, were thus in a condition to act more favorably to the gastric activities, as already seen. It also appears that the more highly alkaline the saliva, the stronger is the acid reaction of the food developed in a short time. A new function of the saliva is thus added to our knowledge of digestive processes in the mouth,—namely, that of regulating the chemical reaction of food, and thus influencing the motor and secretory activities of the stomach Observations made by Chittenden and H. E. Smith are significant in this connection. They found that the most favorable medium for the diastatic action of ptyalin was, under most circumstances, a neutral fluid. The presence of a small amount of acid proteid or even a minute trace of free acid appeared to still further increase the action.

In order to determine salivary influence on the gastric, motor, and secretory functions in pathological conditions, Biernacki studied the digestion with and without saliva in twelve patients, the majority of whom were suffering from diseased conditions of the stomach. He found that, in general, a stimulus to motor and secretory activities was exerted by the saliva as in health, though he notes that the stomach reacted to a less or possibly to the same degree as in health, while there was never a greater stimulating action. In a case of cancer of the liver with jaundice, the stomach contents without saliva contained no hydrochloric acid, and precisely the same condition existed with saliva. This was also true in another case, probably of the same kind, with jaundice and ascites, and in a case of pulmonary tuberculosis too. On the other hand, in a case of diabetes mellitus, where there was marked subacidity without saliva, the admixture of saliva with the food produced a decided increase of acidity; and in a case of hyperacidity without saliva, the admixture of saliva in the parallel experiment gave a reduction to the normal.

Observations were made by the same investigator regarding pepsin formation, and were also of interest. He concludes that salivary influence on enzyme production is much greater in pathological than in normal conditions of the stomach.—*N. Y. Med. Jour.*

PATHOLOGY OF THE ALVEOLAR DENTAL MEMBRANE.—Mr. E. Lloyd Williams read a paper on this subject, which he has been investigating for some years, at the recent meeting of the British Dental Association. He rightly objects to the term "abscess sac," so often applied to an enlarged and inflamed alveolar dental membrane, as being both misleading and unscientific. In the first place, it is not a sac at all, but a solid mass; and, secondly, in the great majority of cases there is no definite abscess to be found. With regard to the cause of inflammation of the root-membrane, septic infection is by far the most common, as in nearly all cases it occurs where the pulp is dead and decomposed. According to Mr. Lloyd Williams, no such thing can take place as a localized periostitis, the whole membrane being invariably affected, though the severity of the attack may vary in different parts. In the earliest stage of alveolar-dental periostitis there is an infiltration of cells into the tissues; later a very loose arrangement of tissue of an adenoid character is seen; and finally, a large number of areas of inflammation are apparent where the leucocytes have collected and are in sufficient quantity to justify the statement that pus is present, but these foci may so coalesce as to form one large suppurating cavity. Beyond these foci of inflammation a varying thickness of fibrous tissue is found. Micro-organisms, chiefly cocci and rod-shaped bacilli, are found in abundance, more especially in the neighborhood of the blood-vessels, but Mr. Lloyd Williams failed to discover any in the fibrous tissue or "limiting membrane," as it might be called. With regard to the changes in the contiguous structures, the surface of the bone next the fibrous tissue is, as might be expected, covered with a layer of giant cells, and the cementum together with the dentine show signs of absorption with redeposition, in a great many cases going on synchronously.—*Lancet.*

THE THIRD MOLAR AND THE TONSILS.—In the *Mercredi médical* for November 15, there is a paper which was read before the Bordeaux Society of Medicine and Surgery by Dr. Dunogier, who related a case of relapsing amygdalitis caused by the eruption of the lower third molars, and a case of chronic amygdalitis kept up by difficulty in the eruption of a third molar. The treatment of such cases, the author remarks, is of two sorts,—preventive and curative. In regard to the practice of extracting the first permanent molar at about the eleventh year of age, he confesses that he does not share the apprehensions that have led some of his *confrères* to advocate that procedure, and he adds that he has never seen the regularity of the dental arch interfered with by allowing the tooth to remain. Moreover, he does not consider that complications due to the appearance of the third molars occur often enough to call for the extraction of the first permanent molars as a preventive. Curative treatment, of course, consists in doing away with the cause, meaning not necessarily the tooth, unless it deviates, but the gum. In some cases the application of chromic acid has succeeded, but this agent is not to be advised in general, because, although it is undoubtedly efficacious, it acts much too slowly. The Paquelin cautery and the galvanic cautery, although much easier to manage than the old actual cauteries, are not to be preferred to excision. Early in his practice the author tried excision with the bistoury and curved scissors, but the operation was very inconvenient, so that he has of late employed an instrument made specially for the purpose,—a sort of *emporte-pièce*,—which he showed at the meeting. After the gum has been anesthetized by means of tampons of cotton soaked in a solution of cocain, the blade is slid under the gum covering the tooth as far as possible and the tissue divided. Gargling for a few times with antiseptics and cauterization of the neighboring ulcerated and inflamed parts with chromic acid complete the cure. Chromic acid applied to the gums causes little or no pain, even without the previous use of an anesthetic, and the acid has, morever, the advantage of not in any way changing the color or structure of the teeth.—*N. Y. Med. Jour.*

CLEFT PALATE IN LIONS BORN IN CAPTIVITY.—In a paper on Cleft of the Hard and Soft Palates, read at a recent meeting of the Philadelphia Academy of Surgery, Dr. J. Ewing Mears stated that observations made in the Dublin Zoological Gardens some years since had quite positively determined that the condition might be due to a want of proper nutrition in the mother during the period of gestation. Up to the time referred to it had been impossible for the authorities in charge of the garden to rear the young of the lion, on account of the invariable occurrence of cleft of the palate, which prevented the taking of nourishment to maintain life. The plan of giving to the mother during pregnancy ground bone and food containing the inorganic elements of bone had been crowned with success, and within recent years a large revenue had been derived from the sale, to all parts of the world, of lions raised in this garden. The lion whelps in the Zoological Gardens of Philadelphia had suffered in the same manner, and he had suggested to the superintendent to adopt the plan practiced in the Dublin garden. During the conversation the superintendent had stated that the whelps of lions in traveling menageries did not suffer like those born of mothers confined in gardens, and he attributed this to the rough life led by them, as well as to the variety in the food, consisting of bones as well as of meat,—sometimes more of the former than of the latter.—*N. Y. Med. Jour.*

FILLING BONES.—Prompted by experiments, made at the instance of Trendelenberg, Dr. Sonnenbürg had also occupied himself with this subject, since there was question about the great advantage to be obtained by a successful method of filling bone-cavities. The first condition was to render this cavity aseptic. But, where there is diseased tissue, osteomyelitis, or tuberculosis, it would seem impossible to render such a cavity so free from micro-organisms that colonies will not continue to adhere to the surface. We must, therefore, employ material that acts not only aseptically, but also antiseptically. Dentists have established the fact that no bacteria grow in the neighborhood of certain fillings. The speaker showed a preparation in which a sphere, free from bacteria, had developed around such a filling. Streptococci and diverse staphylococci were used to ascertain how that area spreads; it was found that inoculation of this area produced no growth on the plates, and that the bacteria had actually been destroyed. The filling consisted of copper amalgam, sticking firmly without reaction. The filling was firmly pressed in with instruments similar to those used by the dentists. The best substance for filling bones is copper amalgam with cinnamon, the latter being very valuable in consequence of the absence of porosity and its quick hardening. He had first filled smaller bone-cavities in men, and could not yet judge whether they will be permanently solid, but he thinks that further experiments are indicated.—*Amer. Med.-Surg. Bull.*

AN ALLOY WHICH ADHERES TO GLASS.—M. F. Walter has found that an alloy consisting of ninety-five parts of tin and five parts of copper adheres so tenaciously to glass that it may be employed as a solder to join the ends of glass tubes. It is obtained by adding the copper to the tin previously melted, agitating with a wooden stirrer, casting or granulating, and then remelting. It melts at about 360° C. By adding from one-half to one per cent. of lead or zinc the alloy may be rendered either softer or harder, or more or less easily fusible. It may also be used for silvering metals or metallic thread. (*Rev. Scientifique*).—*B. and C. Druggist.*

PLASTER OF PARIS.—The method of testing the quality of plaster of Paris is by taking a small pinch of the powder between the thumb and finger and gently rubbing it; if small particles of grit are felt, it indicates that parts of the plaster have already absorbed water, and it is therefore unfit for use. The same test may be observed by taking a pinch of the powder again and placing the fingers under water, and then rubbing in the same way as before. If, however, in both of these tests no grit is felt, and under water a thin, creamy substance is formed, which is easily rubbed off the fingers, the plaster is in a proper condition for use. Where plaster has been kept for a long time, or where it is gritty, its condition can be very greatly improved. It may be re-dried by putting it in a metal dish, such as a pie-plate or iron pot, and placing it in an oven of a hot fire or over a gas jet. As soon as it becomes heated it will be observed that a process identical with boiling water is taking place. When this ebullition has entirely ceased, the powder is freshly kiln-dried. If the method of testing is again resorted to, it will be found that the gritty appearance and feeling will have disappeared, in a very large measure, leaving only the fine dry powder ready for use. If there are any lumps remaining, they may be removed by the use of a sieve. From what has been already said, it will need be but a reminder that the plaster of Paris must always be kept in a hermetically sealed jar, or in a very dry place.—*Charlotte Medical Journal.*

CARE OF THE TOOTH-BRUSH.—The care of tooth-brushes is not sufficiently observed. In our city houses they stand in their cups or hang on their racks above the set toilet-bowls day and night, absorbing any disease-germs that may be floating about. They should be washed frequently—at least twice a week—in some antiseptic solution, strong salt and water or bicarbonate of soda and water being two good and readily provided cleansers. Tooth-washes and pastes should also be kept carefully covered.—*Philada. Ledger.*

SNOW AND SALT.—When you have no local anesthetic convenient, chop up a little ice, or take some snow, mix it with salt, put it in a thin napkin, adapt it to the gums where you want to operate, and after about two minutes' application the gum should be "frozen," and you should be able to extract with little or no pain. In hospital practice, where you want to save poor people pain, this simple application can be used anywhere on the body. I have opened abscesses; I even found it useful in hypersensitiveness of dentine. I constructed a little cup or bowl on the end of a dental instrument for the purpose of carrying the snow-salt and applying it to the gums, but it is easily applied in an ordinary mouth-napkin. If a pulp is exposed, close the cavity with cotton before applying the snow-salt.—*Dominion Dental Journal.*

Why do Vulcanite Upper Plates Crack?—1. Because they are too thin.

2. Because they are too thick.
3. Because they are vulcanized too hard.
4. Because they are vulcanized too soft.
5. Because they are badly articulated.
6. Because the *dens sapientiæ* in the process of growth presses too much on the part of the plate which covers the tuberosities of the superior maxillary.
7. Because of the want of lower bicuspids and molars.
8. Because they are not worth a cent at any rate.—*Dominion Dental Journal.*

Dermoid Cyst of Face.—At a recent meeting of the Pathological Society of London, Mr. Bowlby showed for Mr. Paul (Liverpool) a tooth-bearing dermoid of the face, which was removed from the cheek of a boy aged five years. It was regarded by the parents as a birth-mark, and excited no special attention until five or six months ago, when a tooth appeared at the upper part. The tumor was situated on the left side of the nose a little below the eye; it had no connection with the bone, and there were no teeth missing from the jaws. At the time of removal the tumor consisted of a soft pad of skin below, and above of a little rim of gum-like tissue from which projected a left upper lateral incisor with its lingual surface uppermost. Beneath the erupted tooth was a small permanent tooth of the same character. Attention was drawn to the following points: the rarity of teeth in true superficial dermoids; the marked individual character of these teeth; the association of a permanent with the temporary tooth; the fact that the teeth belonged to the side on which the tumor was placed, and that, if these ought to be regarded as misplaced teeth, though the normal number were present in the jaws, yet additional laterals were among the most frequent of supernumerary teeth.—*Lancet.*

Extensive Alveolar Abscess.—One of the fortunately rare cases of alveolar abscess invading the neck is reported by Dr. Maughan in a recent number of the *British Journal of Dental Science.* The patient was an artisan aged forty-five, and there was a history of four or five previous swellings over the upper and lower jaw. When seen he had been suffering for ten days from a swelling on the left side of the neck,—red, painful, hot, and throbbing. There was a large fluctuating swelling on the left side of the neck, extending downward to the left clavicle and across the root of the neck to the right side and upward to and involving the left lower jaw. The cause was plainly periostitis around the second left lower bicuspid. An incision gave vent to two saucerfuls of pus, and the wound rapidly healed under antiseptic dressings. As a general rule alveolar abscesses discharge into the mouth either by perforating the alveolus, usually the outer, it being the thinner, or the pus wells up around the neck of the tooth, the periosteum being stripped off the cementum, but occasionally they burrow for a considerable distance. In this case the course of the abscess was evidently influenced largely by the anatomical relations of the cervical fascia. Very few similar cases are, we believe, recorded in dental literature, but perhaps they are not so uncommon as this fact would represent, since they would be more likely to come into the hands of the surgeon than the dental practitioner.—*Lancet.*

Cocain Injections.—Cocain, though very extensively used as a local anesthetic, has caused many accidents, owing to improper application. Réclus insists that the dose should not exceed one-fifth of a grain (12 mg.) for small operations, and from one to three grains (6–19 ctg.) in the large operations. The injection should always be made in the recumbent position, and care should be taken not to puncture a vein. If all these precautions be taken, the administration of cocain, it is maintained, will be devoid of danger.

Gauthier holds that if a one per cent. solution of nitroglycerin be added to cocain, all possible danger is avoided, and the patient need not be kept lying down,—an awkward position in the case of tooth-extraction. The formula which he has employed extensively for the last two years is as follows:

Cocain hydrochlorate, 20 ctg. (3 grs.);
Alcohol. sol. nitroglyc. (1 per cent.), 0.6 c.c. (10 min.);
Distilled water, 10 c.c. (2½ fl. dr.).

Each syringe (1 c.c. = 16 min.) contains 2 ctg. (⅓ grn.) of cocain, and 1 min. (0.06 c.c.) of the nitroglycerin solution. Instead of all the symptoms of collapse which have been frequently witnessed with the simple solutions of cocain, the face gets flushed, the heart beats quicker and stronger, and the patient altogether feels quite comfortable,—assisting passively at the operation, without betraying any suffering.—*Amer. Med.-Surg. Bull.*

INCOAGULABLE ALBUMEN; A CULTURE-MEDIUM.—Incoagulable albumen, serviceable as a culture-medium for bacteria, is reported to be prepared by adding a 1:1000 solution of ferrous sulfate to a filtered solution of fresh egg-albumen in distilled water. As many cubic centimeters of the iron solution are added to each liter of the albuminous solution as the latter contains parts per cent. of albumen. Thus, to a five per cent. solution of albumen five cubic centimeters of the iron solution are added. The salt prevents coagulation on heating, and the mixture can at once be sterilized in an oven at 115° C. (239° F.). The medium is described as perfectly limpid, and of a slightly alkaline reaction. In use, it replaces the ordinary culture-bouillons. —*Amer. Med.-Surg. Bull.*

THE TREATMENT OF ACTINOMYCOSIS OF THE JAW.—A new case showing the efficiency of potassium iodid in the treatment of actinomycosis has been recorded quite recently by F. Buzzi and B. Galli-Valerio (*Nouveaux Remèdes; Journ. de Médecine de Paris*). The case occurred in a young man who contracted the disease while farming. The malady began by a localized pruritus on the external surface of the gums, invading afterward especially the gum of the last right superior molar. The patient sought to relieve the itching by scratching with a straw. The gum became tumefied, this tumefaction invading little by little the parotid and masseteric regions, all of the right cheek, the eyelids, the mastoid region, and the right half side of the neck just over the clavicle. The real nature of the disorder was not recognized at first. At the beginning the tumor was not painful, and presented several fluctuating points. These purulent foci were opened; but, notwithstanding the cleansing of the walls of the abscesses and the irrigations of bichlorid solutions, the tumor did not subside and the suppuration continued. Lancinating pains supervened over the neck and back of the head, and there was a slight feverish reaction. Examination of the pus afterward showed the case to be one of actinomycosis. The patient was, therefore, put under iodid of potassium, in daily doses of two grammes. After a few days amelioration was noticeable. The fistulous openings began to close, tumefaction was diminished, and the pain disappeared. In three months more a complete cure was established.—*Therapeutic Gazette.*

CORROSIVE SUBLIMATE IN WOUND-TREATMENT.—According to the *Ohio Dental Journal*, a simple solution of mercuric chlorid in water should not be used in wounds, as it forms an insoluble albuminate of mercury in contact with the albuminous matter. To prevent this, Dr. Laplace, as far back as 1887, advised the use of tartaric acid in combination with corrosive sublimate. Drs. Liebert and Schneider, however, found that the acid caused irritation, and that an alkaline chlorid accomplished the desired results better; therefore an addition of chlorid of sodium or ammonium is recommended.—*Notes on New Remedies.*

HINTS, QUERIES, AND COMMENTS.

Correction.—Dr. J. G. Templeton calls our attention to an error in the description of his method of obtaining a correct articulation for an entire set of teeth as published in our last issue. On page 164, line 21, where the words "*wax model*" occur, the word "face" should be substituted, so that the sentence shall read, "observing that the lower third of the face is in proper proportion or length to the upper two-thirds," etc.

What is Phenosalyl?—We have from a correspondent an inquiry as follows: "On page 75 of your last number [January] is an article from the *Medical Standard* on 'Phenosalyl,' which includes benzoic acid as one of the ingredients and not menthol, in which respect it differs from the formula published on page 99 of the November issue of *Notes on New Remedies*. Which is correct? I have been unable to purchase this preparation ready made, and have had trouble trying to have it prepared from the above formula. Is this preparation on the market?"

Messrs. Lehn & Fink have supplied us with the following explicit information, which we publish for the benefit of those interested:

"Phenosalyl is the name applied to a new antiseptic mixture introduced by J. de Christmas, of Paris. It is produced by melting together

Carbolic acid, 6 parts;
Salicylic acid, 1 part;
Lactic acid, 2 parts;
Menthol, $\frac{1}{10}$ of 1 part.

"This makes a clear, syrupy liquid, which will crystallize at low temperatures, but can be made non-crystallizable by the addition of a little glycerin; it is easily soluble in about fifteen parts of water, and more readily in alcohol and ether. It is employed in one and two per cent. solutions for sterilizing instruments, for wound-treatment, and generally as an antiseptic.

"The above facts were furnished without reserve by M. de Christmas about a year ago at some French society meeting, and were published widely in French, German, and American drug and medical journals. There was no secret about the matter at the time, and M. de Christmas probably had no intention of exacting any royalties from his discovery or suggestion. Subsequently, a few months ago, a German firm—which already controls almost a complete materia medica of new remedies—issued a circular claiming sole proprietary right in phenosalyl, and has meanwhile put a trade-marked, and probably patented, product on the market; this article is obtainable through wholesale druggists at about $1.50 per pound.

"But there is no law that will prevent any man from making a mixture according to above formula; and if the product of such a mixture will give the surgeon and physician satisfactory antiseptic results, let them prescribe it by formula and anybody can make and dispense it. But the proprietary name 'Phenosalyl' must not be used; that would be an infringement. Refer to it as 'de Christmas' antiseptic' (thus assuring the originator due credit), and in prescribing always write out the full formula. That is an honest proposition,—and it is good ethics, too."

Dr. J. Alberto del Solar, Santiago, Chile, has furnished us for publication the following formula for his local anesthetic to be used in the painless extraction of teeth:

℞—Alcohol, 98 per cent., f℥ ij;
Chloroform, f℥ iv;
Ether. sulf., f℥ iss;
Camphor, ℥j. M.

The solution thus made is to be applied to the gum for one minute, both buccally and lingually. It is not intended for hypodermic use, and to secure the best result the gum should be carefully dried before making the application. Dr. Solar states that he has successfully used the preparation in his practice for more than a year. It has been recently tested in the clinics of the Pennsylvania College of Dental Surgery to a limited extent, and in response to a request for his opinion upon its merits, Dr. George W. Warren, the chief of clinic, writes to us as follows:

"TO THE EDITOR OF THE DENTAL COSMOS:

"*Sir*,—In reply to yours of recent date, I beg to say that the local anesthetic to which you refer (Dr. Solar's formula) has been frequently used in the college extracting-room with considerable success. I have personally employed it in a few cases, and with one or two exceptions the patients have stated that the extraction was painless. I have not yet, however, had an opportunity to see if there were any objectionable after-effects.

"Very truly yours,
"GEO. W. WARREN."

The use of somewhat similar solutions for the purpose indicated has occasionally been noted, though no sufficient record is obtainable upon which an estimate of their efficacy could be made. We give the foregoing facts publication in the hope that those interested in the subject will test the Solar anesthetic, and report the result for the benefit of all concerned.

PYROZONE IN THE TREATMENT OF SUPPURATIVE GINGIVITIS.—In cases of suppurative gingivitis, I may almost say that the use of the pyrozone three per cent. solution, supplementary to the removal of all calculary deposits, will effect a radical cure.

The treatment is as follows: Begin by spraying the gingivæ thoroughly with pyrozone three per cent. solution. In a moment the abundant effervescence will disclose every pocket which has secreted pus. This is washed away with warm water. Then, with the instruments, all deposits are thoroughly removed, all hemorrhage being controlled. In virulent cases, spray with pyrozone twenty-five per cent. solution, but in ordinary cases pyrozone five per cent. solution is quite powerful enough. As a diagnostic symptom, I may mention that the greater the congestion—or hypertrophy—the more rapidly will an eschar be formed, and as the parts recover their health, this will be less observed. If pain follows the application, it may be almost instantly relieved by applying glycerol of tannin. I prepare mine thick and spread on folded bibulous paper, which is laid against the gums and left as long as the patient will permit.

This treatment is to be resorted to twice a week, and a very few sittings will show marked improvement, if not a cure.

The patient must use pyrozone three per cent. solution as a mouth-wash during this time, and it would be well to recommend those with this tendency to add it permanently to their toilet requisites. Two drops of oil of wintergreen in the regular four-ounce bottle will flavor the solution.

In cases where, from sensitiveness at the neck of the teeth or elsewhere, pain is caused by the one-twentieth of one per cent. of acidity of the pyrozone, it may be neutralized by placing a small particle of carbonate of magnesia in the tumbler, and then pouring in the pyrozone three per cent. solution to be used. —R. OTTOLENGUI.

THE following letter, published in the *British Medical Journal* of January 13, 1894, indicates that the light is beginning to break in upon the minds of some of the surgeons of Great Britain with respect to the dangers of chloroform-anesthesia, in certain cases at least:

"*Sir*,—In the last fortnight two more deaths have occurred from the administration of chloroform for the removal of adenoid growths from the nasopharynx.

"In one case I have reason to know that the danger of this anesthetic was pointed out and the alternative employment of nitrous-oxid gas forcibly though unavailingly urged. Letters have been recently printed in the columns of the *British Medical Journal* and in those of its two weekly contemporaries from the pens of Mr. Wyatt Wingrave, Mr. Lennox Browne, and Dr. Dundas Grant respectively, urging the complete safety and efficiency of nitrous-oxid gas in these operations. All of these gentlemen are attached to the Central London Throat and Ear Hospital, where this anesthetic has been employed during the last three years on about two thousand occasions with complete efficiency and without accident. I have myself been responsible for the administration of nearly half this number, as well as in two or three hundred other cases in private practice.

"The long list of fatal results from chloroform is calculated to bring a valuable operation into disrepute, and I venture to say, with all respect, that in the light of the foregoing experience the word 'misadventure' cannot much longer be properly applied to the verdict. I am, etc.,

"W. G. HOLLOWAY, M.D. Cantab.,
"*Registrar and Anesthetist to the Central London Throat and Ear Hospital.*"

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—I have read with great pleasure and interest, in the DENTAL COSMOS of December and January, the communications of Drs. Baldwin and Flanagan on the subject of dental education. This is a matter, I think, in which all conscientious dentists should feel interested, both for their own sakes and that of humanity. We all know how much more agreeable it is to work for a patient who understands intelligently what we are doing for him, than for one who is ignorant of what is being done. Now, what is the best course to pursue in order to gain the most beneficial results? A great deal has been said and done about the treatment of so-called dead teeth. I believe a large per cent. of the labor expended in that direction has been fruitless, simply because the people are not intelligently educated in regard to the importance of good teeth and the care necessary to preserve them. If the public knew as we do the necessity of good teeth to maintain good health, I think they would join with us in trying to secure some method of generally teaching the hygiene of the teeth. We should be able to devise some plan to educate the people on this subject, so that they would understand how to prevent caries of the teeth. If this could be accomplished, we would soon commence to look on dead teeth as something of the past. When we reflect that more than ninety per cent. of the teeth are lost as the result of ignorance or neglect, we will agree that an effort should be made to educate the people on this subject. Now, what is the most feasible plan? We must admit that it is a great undertaking, but by no means impossible. I believe that children should be placed under the care of a competent dentist as early as three years of age, and be made to understand as soon as possible the importance of good teeth to health. Mothers should be informed how often they should consult a dentist for their children and be instructed on this subject. We all know that irregularities of the teeth are often caused by neglect while young. We have all seen children *fifteen years* of age and *older* who had not yet lost their *baby teeth.* We are sorry for the poor children, but that is all the good it does them. We have many things taught in our public schools, at public expense, that are not of such great importance or practical utility. Why not have the hygiene of the teeth taught by competent teachers? If that could be done, how soon we would feel the good results, and the public would say, May the good work continue! Were this accomplished, I think every one instrumental in bringing it about would, at no distant day, receive grateful thanks for the benefits obtained. I offer these few suggestions, hoping some one may better see a way of correcting the present evils.—WM. HUGHES, Auburn, N. Y.

H. ALEXANDER FRANCIS, in *The Lancet*, July, 1893, recommends papain as a selective caustic because of its known activity as a digester and destroyer of dead and diseased animal matter. It is a powder and non-poisonous. It has been successfully used by insufflation for removing the false membrane of diphtheria; also in the treatment of lupus and tuberculous ulceration of the vocal cords. The drug possesses properties which seem to indicate a possible usefulness in dental practice for digesting and removing the shreds of pulp-tissue after devitalization in tortuous and inaccessible root-canals.

A RECENT French publication contains the following:

"There has just been buried in a little village of England an old dentist who passed fifty years of his life in pulling out the molars of his neighbors, as he never knew any other method of practice than this radical proceeding.

"In his will he requested—truly a crazy idea—that there should be buried with him all the teeth that he had extracted during his life. His administrators piously carried out his wishes, and in his coffin there were placed thirty thousand teeth that the deceased had drawn out of his patients during his long career.

"Thirty thousand teeth! Just think of it! That makes almost nine hundred and fifty full sets of thirty-two."

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JANUARY, 1894.

January 2.—No. 512,065, to WARREN A. SPALDING. Box for tooth-powder.
January 16.—No. 512,840, to JAMES R. PHELPS. Dental mold for teeth.
" " No. 512,841, to JAMES R. PHELPS. Artificial tooth-crown.
" " No. 513,015, to W. S. HOW. Dental forceps.
" " No. 513,016, to W. S. HOW. Teeth separators.
January 23.—No. 513,178, to CHAS. L. FURMAN and GEO. E. HOLLAND. Adjustable angle attachment for dental hand-pieces.
" " No. 513,213, to JERE E. STANTON. Electric-motor controlling device.
" " No. 513,214, to JERE E. STANTON. Adjustable dental engine bracket-arm.
" " No. 513,328, to JAMES W. IVORY. Rubber-dam clamp.
" " No. 513,362, to GEO. A. FOSTER and CHAS. E. HOFFMAN. Dental plugger.
January 30.—No. 513,797, to THEO. G. LEWIS. Chloroform mixer.
" " No. 513,818, to ELI H. NEIMAN and SAM'L E. BEECHER. Artificial tooth.
" " No. 513,924, to JOHN J. HARTNETT. Inhaler.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a Thesis.

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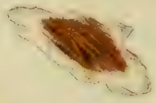
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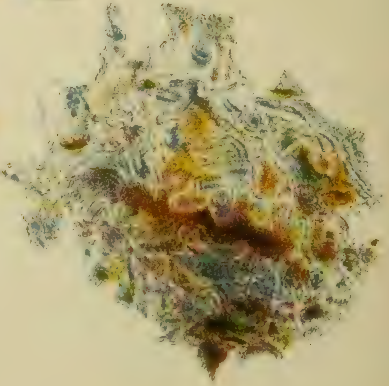
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THE

DENTAL COSMOS.

VOL. XXXVI. PHILADELPHIA, APRIL, 1894. No. 4.

ORIGINAL COMMUNICATIONS.

THE DEPOSITS UPON THE TEETH, WITH SPECIAL REFERENCE TO GREEN AND METALLIC DEPOSITS.

BY W. D. MILLER, M.D., D.D.S., BERLIN.

The White Deposit.

1. THE white deposit (materia alba of Leeuwenhoek) has repeatedly been the subject of investigation, and its nature and origin are so well known that it is not necessary here to dwell at length upon it. It forms a white or dirty white, very soft or cheesy accumulation, chiefly upon the necks of the teeth at the margin of the gums. Where the hygiene of the mouth is neglected, it may cover the whole labial surface of the teeth, or even the whole crown, as is often the case with loose molars which have no antagonists. It consists of mucous epithelial cells, salivary corpuscles, masses of bacteria of varying size and form, often intermixed with particles of food.

Its action upon the teeth is determined by its reaction. In pure form it has an alkaline reaction ; intermixed with food it may have a neutral or even an acid reaction, especially where carbohydrates predominate.

Out of twelve cases which I examined in reference to this point, seven showed an alkaline and five a neutral or acid reaction. Only in case of an acid reaction can it be said to have a direct injurious effect upon the tooth-substance.

The constant presence of the fermenting or putrefying deposit exerts, however, in the course of time, a deleterious action upon the gum-margin and upon the pericementum, besides giving rise to *fœtor ex ore.*

Where the deposit is very extensive, an eventual deleterious action upon the mucous membrane, and finally upon the process of digestion, cannot be excluded.

White Tartar.

This form of deposit need likewise be referred to but very briefly, since it is treated at sufficient length in works on dental surgery, and opinions as to its nature require little modification. At the time of formation it is almost white or grayish-white, but it soon becomes discolored by various agencies in the mouth, assuming a yellowish, yellow brown to dark brown color. *The surface lying in contact with the gums usually has a greenish-brown color.* It varies much in hardness, being, when rapidly formed, sufficiently soft to be easily crushed between the fingers, its hardness increasing with the slowness of formation. It consists of an organic matrix (mucous epithelial cells, bacteria, food-particles, etc.), with about seventy-five per cent. of inorganic matter, salts of lime, with traces of salts of alkalies, phosphate of iron, and silica.

Vergne (Hoppe-Seyler, "Physiol. Chem.") found as much as 12.75 per cent. of phosphate of iron in the tartar of molars, but according to the analyses of others and my own investigations anything like a constant occurrence of such enormous quantities of iron in tartar appears to be quite out of the question. White tartar is a precipitate from the saliva, and not the product of bacterial growth, as some have claimed.

Surfaces covered by tartar are perfectly protected from decay. Its injurious effects upon the gums and pericementum are, however, such that its thorough removal at regular intervals cannot be too strongly insisted upon.

Green Deposits (*Green-Stain*).

There is scarcely any subject connected with the pathology of the teeth of which we possess so little definite knowledge as of the one placed at the head of this paragraph.

While the question of dental caries has been a disputed one for twenty centuries or more, every age has had its theory which has been adopted by the majority ; concerning "green-stain," however, there has never been an accepted theory, and we have usually been content to acknowledge our complete ignorance of its nature.

Many views have been expressed from time to time, but they have usually been so lacking in foundation that they have received no general credence. It may, however, be interesting, in connection with a study of the subject, to reproduce a few of them :

Robinson, "The Surgical, Mechanical, and Medical Treatment of the Teeth," German edition, pp. 129 and 131 (1848) : "The third kind of tartar is a thin coating of a matter of greenish color and *very sour* character. It occurs, originally, as a discolored arch upon the labial surfaces of the teeth, near the margin of the gums. This tartar must be at once removed and the enamel under it well polished in order to prevent its reappearance, otherwise it will renew its pernicious action on the enamel and entirely denude the teeth, destroying the crystalline appearance of the enamel, whereby the underlying dentine suffers and becomes carious."

Fox and Harris, "Diseases of the Human Teeth," p. 298 (1855) : "There is another kind of tartar, which collects chiefly around the teeth of young persons ; it is of a dark green color, rather resembling a stain than an earthy concretion. It is very injurious in its effects upon the teeth, as it corrodes the enamel and disposes the teeth to become carious."

Nessel, *Zahnheilkunde*, p. 107, note (1855) : "In young people a peculiar coating of greenish color often appears (on the teeth), which cannot be removed with any instrument. Fox and others considered it very pernicious, as it was said to corrode the enamel and to predispose the teeth to caries; this is, however, refuted by experience."

Zur Nedden, *Zahnheilkunde*, p. 504 (1861): "In boys and girls the permanent teeth become discolored soon after erupting by the deposition of a dark green pigment upon the enamel. The seat of the discoloration is, according to my opinion, the layer of tissue which is connected with the cement of the root of the tooth."

Leber and Rottenstein, "Untersuchungen über die Caries der Zähne," p. 23 (1867): "This tartar, as is well known, is found principally in young individuals, on the front teeth, and is *usually ascribed to a decomposition of the enamel-cuticle.* It is to be remarked that the process does not confine itself to the surface of the tooth, but penetrates into the substance of the enamel."

Klencke, "Die Zähne, ihre Natur und Pflege" (1869), ascribes the formation of green-stain to his Protococcus dentalis. "It is found only on teeth exposed to the light."

Wedl, "Pathology of the Teeth," pp. 359 and 390 (1872): "The deposit is a green, green-yellowish, uniformly minutely granular mass, which is morphologically identical with the matrix of leptothrix. . . . I have never observed a penetration of the green, granular mass into the peripheral enamel layer."

Tomes, "Dental Surgery," 2d ed., p. 560 (1873): "It is sometimes met with among the lower animals, both domesticated and wild, in whom caries is very rarely seen, and the color, which is perhaps of vegetable origin, probably occupies the substance of the enamel-cuticle. Most writers have found it to be perfectly innocuous."

Taft, "Operative Dentistry," page 26 (1877), remarks: "Wherever present, the surfaces of the teeth are abraded; and when it is of long standing, the entire enamel beneath it is destroyed and the dentine is gradually involved in the dissolution."

Schlencker, "Illustrirte Zahn- und Mundpflege," p. 107 (1884), considers green-stain exceedingly dangerous to the teeth, because "the enamel is broken down by it."

Baume, *Zahnheilkunde*, p. 267 (1885): "If the enamel-cuticle is isolated by acids, it will be found to be permeated by a granular, greenish substance, which is to be attributed to an accumulation of leptothrix. . . . But the rough surface which is often found under green-stain proves that, nevertheless, a very superficial decomposition of the enamel has taken place. The green-stain may therefore, to a certain extent, be regarded as predisposing to caries."

Brandt, *Zahnheilkunde*, pp. 260, 261 (1890): "This makes it evident that the process is by no means restricted to the surface of the teeth alone, but in part *also penetrates the upper layer of the enamel.* . . . On application of mineral acids the green-stain immediately disappears."

Bastyr, "Scheff's Handbuch der Zahnheilkunde," ii, 2, p. 605 (1892), is inclined to accept Nessel's view that the stain has no injurious effect upon the teeth.

Ottolengui, DENTAL COSMOS, 1892, p. 707, attributes the formation of green-stain chiefly to the fermentation of milk in the mouth. "It is my belief that the fermentation of the residuum from the milk which adheres to the enamel produces the green-stain. Unlike other deposits upon the teeth, this one almost invariably acts destructively.''

Moffat, *Internat. Dental Journal*, 1892, p. 752, in answer to a question by Banfield regarding green-stain, replies: ''These stains are usually produced by iron.''

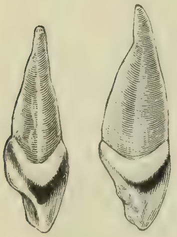
Heidé and Charpentier, *Revue internat. d' Odontologie*, January, 1893: ''Green deposit is produced by a parasite, the Leptothrix buccalis, Robin.''

One great difficulty encountered by every one who has attempted to examine this question has been that of obtaining material for the investigations. I wish here to express my indebtedness to all who have aided me in the matter, and in particular to Zahnarzt Paul Ritter, of Berlin, without whose assistance it would have been impossible for me to carry on my studies on green-stain. From first to last, Mr. Ritter must have provided me with two hundred teeth showing green deposits in various degrees.

Green deposits do not, however, occur so seldom as the scarcity of material might justify us in concluding. On the contrary, a careful examination will discover green-stains or deposits on the teeth of fifty per cent. even of those who give average attention to the care of the mouth. At least sixty per cent. of the children in two orphan asylums visited by me showed green-stain on the teeth in varying extent. An examination with the magnifying glass often reveals the stain where it is not detected by the naked eye. In milk-teeth it occurs chiefly in form of a narrow band, convex toward the gums, extending across the labial surface of the teeth near the enamel-margin, and spreading out more or less upon the approximal surface. The band is usually sharply defined toward the gums, but often more diffuse toward the cutting-edge (Plate, Figs. 9 and 10).

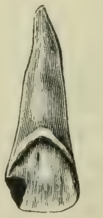
Its extension on the permanent front teeth will be best seen by a study of the plate as well as of the wood-cuts (Figs. 1 and 2). Here again the convex margin is sharply defined, the stain stopping where the white deposit begins; toward the cutting-edge it spreads out in a diffuse form (Plate, Figs. 1–12). It usually extends more or less upon the approximal surface, and sometimes reappears in much diminished intensity upon the lingual surface (Fig. 2). We frequently find this deposit in form of a spot only on the approximal surface of the incisors at the margin of the gums, or as a thin streak near the gums on the lingual surface of the upper front teeth, bicuspids, or even molars. In putrid conditions of the mouth we often see a more or less greenish discoloration of nearly all the teeth.

FIG. 1.



Extension of green-stain on the approximal surface of incisors.

FIG. 2.



Extension of green-stain on the lingual surface of incisors.

The green deposit occurs very much more frequently upon the upper than upon the lower teeth, the former often being intensely green while the lower are perfectly free. The opposite may also be found, though it is very rare; I have seen but five such cases in the last six months.

Depressions, pits, grooves, scratches, etc., are always predisposed to green-stain as they are to deposits of other nature; the stain will even often be found to be confined to the enamel-striæ.

The color of the deposit varies, according to the amount of green coloring-matter, from grayish-green, light green, dirty green, dark green to bluish-green, sometimes the green color appearing only under the magnifying glass.

In some cases the deposit permeates the entire enamel-cuticle; in others it is confined to the surface, and may be rubbed off with comparative ease. Removal of the enamel-cuticle by acids invariably exposes a colorless enamel surface, except where defects are present.

For a long time my attempts to determine whether the presence of the enamel-cuticle is necessary to the formation of the green deposit led to no results. Recently, however, I have seen three cases which seem to point to a negative answer. In two of them, recession of the gums had taken place, and the green-stain extended upon the neck of the tooth far beyond the enamel-margin. In the third case, an old filling of phosphate cement on the approximal surface of a very green incisor showed a distinct green deposit on the margin joining the labial surface.

Microscopic Examination of the Enamel-Cuticle.

For isolating the enamel-cuticle I have used a ten per cent. solution of hydrochloric acid. In about two to four minutes the membrane begins to loosen at the edges, and in five to ten minutes its connection with the enamel is completely dissolved. The skin is then placed in pure water to remove the acid, after which it is carefully lifted out of the water on a cover-glass gently inserted beneath it. The cover-glass is then inverted and dropped upon an object-glass. The attempt to handle the cuticle with the spatula, glass rod, etc., usually results in tearing or folding it, so that it becomes unfit for examination.

Under the microscope the staining may appear diffuse; best seen where the membrane is folded or turned up at the edge, or in irregular blotches, streaks, or granules (Fig. 3), or in forms bearing a certain resemblance to bone-corpuscles (Fig. 4). Finally, we frequently find the deposits in a very fine net-work corresponding to the configuration of the ends of the enamel-prisms, also indistinctly seen in Fig. 4; or in parallel rows corresponding to the striæ of the enamel (Fig. 5). In Fig. 6 we see the appearance of the deposit upon an enamel surface which had apparently been scratched or roughened by some mechanical agent.

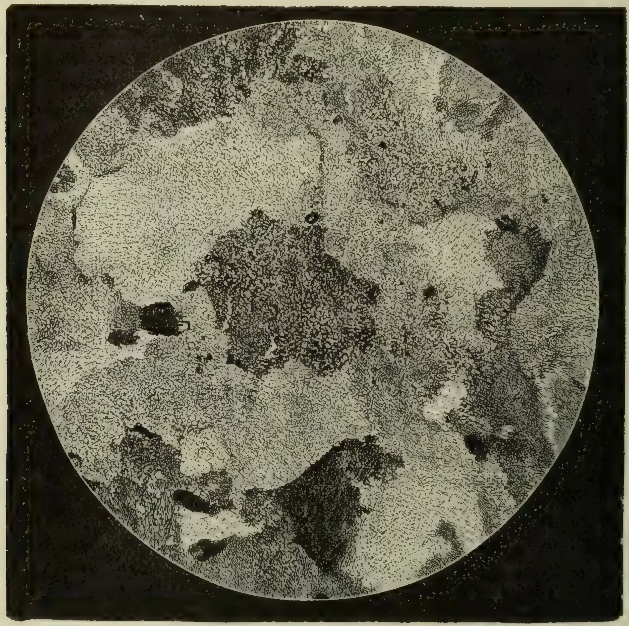
Solubility of Green-Stain.

The coloring-matter of green-stain is characterized by its insolubility in nearly all of the ordinary solvents. Isolated cuticles left for twenty-four hours in water, glycerin, alcohol, ether, chloroform, oil of turpentine, etc., do not show any apparent diminution in the intensity of the color. Three teeth kept for twenty-four hours in a mixture of alcohol and ether, then for three days in oil of turpentine, were only incompletely bleached.

Likewise the acid used in isolating the skin seems to reduce the color but slightly. Some isolated cuticles left in a ten per cent. solution of hydrochloric acid were not completely bleached in twenty-four hours. In ten per cent. nitric acid they had lost but little color in three days. Even nitro-hydrochloric acid required some hours to completely destroy the coloring-matter. Tincture of iodin, contrary to general belief, does not act rapidly upon the color, and its action in cleansing the teeth has been somewhat overrated.

Four teeth with green-stain were protected on one-half of the labial surface with wax, and put into tincture of iodin for five to ten minutes; they were then rinsed in alcohol and the wax removed. In two cases a slight change in the stain appeared to have been effected by the iodin. On applying a brush with pumice, the half not treated with iodin cleansed about as readily as the other.

FIG. 3.



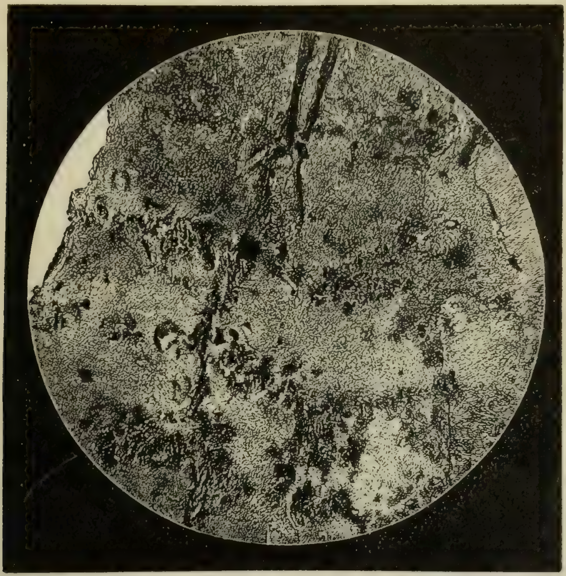
Enamel-cuticle showing the deposition of green-stain in form of blotches. 85:1. (From a photomicrograph.)

Chlorin destroys the coloring-matter rapidly, as does also the peroxid of hydrogen. The cuticles are bleached in a few minutes by a ten per cent. solution of H_2O_2; also a simple application of a ten per cent. solution to the tooth on cotton often effects the bleaching slowly. Of course a twenty per cent. solution acts more rapidly than a ten per cent. We return to the question of solubility, under "Derivatives of the Coloring-Matter of the Blood."

In undertaking the task of an inquiry into the nature of green-stain, the question which seemed to me to demand settlement first was whether the coloring-matter was an organic or an inorganic substance.

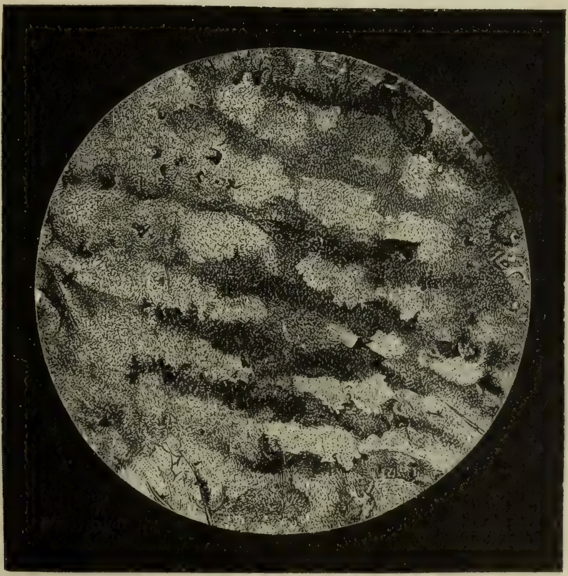
I at first hoped to be able to settle this question by means of bleaching agents, under the supposition that if the stains were readily destroyed by such agents the conclusion would be justified that they were of organic nature. Further thought, however, and a few experiments soon showed me that powerful bleaching agents, in particular

FIG. 4.



Showing a very common appearance of the enamel-cuticle with deposits of green-stain. 85:1. (From a photomicrograph.)

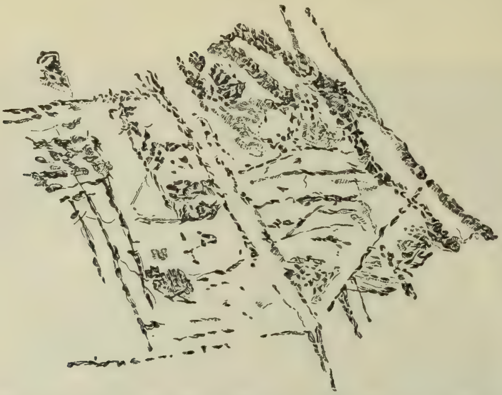
FIG. 5.



Enamel-cuticle showing the deposition of green-stain in parallel zones corresponding to the enamel-striæ. 85:1. (From a photomicrograph.)

chlorin, decompose many inorganic as readily as they do organic compounds.

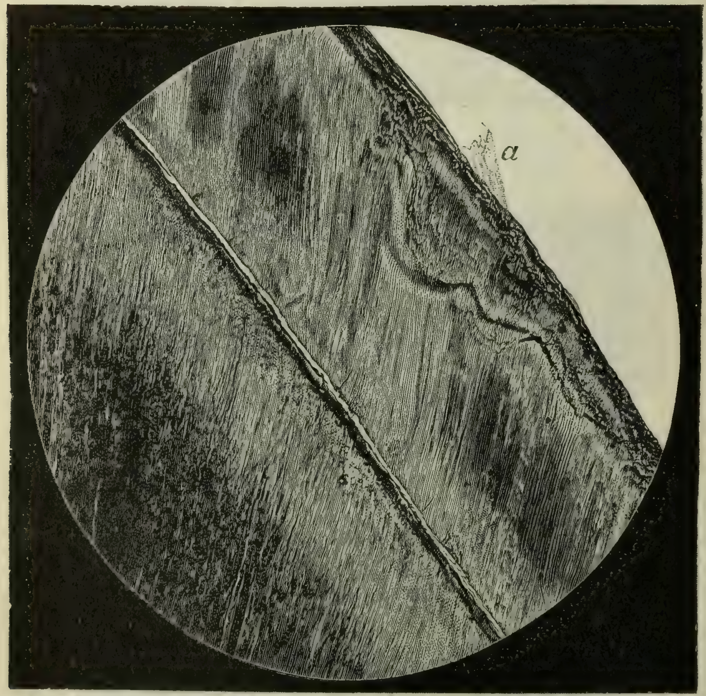
Fig. 6.



Enamel-cuticle showing the deposition of green-stain in scratches. 200:1.

The action of chlorin on green-stain was nevertheless tested in over twenty cases. The enamel-cuticle, in a moist condition, whether isolated or *in situ*, was invariably bleached by chlorin in a few minutes. Chlorin likewise acted very rapidly upon green leaves, algæ, proto-

Fig. 7.



Ground section of enamel and dentine from a milk-tooth, showing the apparent action of green-stain upon the enamel. The iron test having been applied to the section, the enamel-cuticle is partly broken up as at *a*. 85:1. (From a photomicrograph.)

coccus, etc., and nearly as readily upon stains artificially produced by the salts of iron, copper, etc. Consequently the action of chlorin gave little clue to the nature of green-stain.*

Peroxid of hydrogen shows much greater differences in its action upon different teeth. Ten per cent. solution bleaches the thin green-stain in five to ten minutes, whereas the thick dark green deposits require much more time. In one case I still found traces of the green deposit after the tooth had been left for eight hours in the solution. These results pointed to the conclusion that the green deposits are not all of the same nature and origin, a conclusion which was confirmed by the results obtained on burning the teeth.

Calcination Experiments.

These experiments required a great deal of time and a great deal of patience, since any attempt to hasten the burning process is liable to be followed by the enamel exploding into hundreds or thousands of pieces. After having lost a great number of teeth in this way by attempting to burn them in platinum crucibles, I hit upon a process which gave much better results, and admitted of reducing the time from half an hour or an hour to a few minutes. It consisted in wrapping up the tooth in platinum gauze, which had the effect of preventing the complete disrupture of the tooth, or at least of retaining the pieces in place.

The tooth was in this way gradually heated in the flame of a Bunsen burner to a bright red heat. After cooling, the gauze was carefully unwrapped and the tooth examined. The enamel, which always appeared shelled off from the dentine in one piece or in several pieces, was then placed in a platinum crucible, and brought to a white heat for from five to ten minutes; or, more commonly, it was taken upon a loop of platinum wire and held directly in the flame to complete the calcination.

Green deposits comport themselves on burning in some cases like organic matter; in others they leave a residue, which shows them to be inorganic. We must accordingly distinguish between green deposits of organic and those of inorganic nature.

Green Deposits of Organic Nature.

The question as to the nature and causes of the organic green deposits is one which I have found extremely difficult to determine, since the quantity which one can obtain at any one time is so small that a chemical analysis appears altogether out of the question.

The isolated enamel-cuticle leaves no residue on burning. Burnt *in situ* on the enamel, it first appears black; only on prolonged burning does it become tolerably white, since the necessary oxygen permeates the cuticle with difficulty.

Even teeth which appear quite normal often show black spots or blotches upon the surface of the enamel when burned, which are only the remains of organic deposits in the enamel-cuticle, or of the cuticle itself, which have not been completely calcined.

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* Chlorin was found to act with striking rapidity upon the spores of moulds. The green spores of Penicillium glaucum lose their color almost instantly under the action of chlorin, and lose their vitality at the same time.

Chlorophyll as a Cause of Green-Stain.

The view was formerly advanced, particularly by Klencke, and indeed it still has advocates, that green-stain is produced by the presence of chlorophyll, due to a growth of algæ on the teeth.

I think we may safely say that algæ do not grow upon the teeth, —at least numerous microscopic examinations have thus far failed to reveal them. This fact does not, however, preclude the possibility of chlorophyll being a constituent of green-stain, since there are a few species of bacteria in which it has been found.

Chlorophyll is readily soluble in ether, whereas the coloring-matter of green-stain is not perceptibly affected by either alcohol, ether, or chloroform. The spectroscopic examination likewise gave no indication of the presence of chlorophyll, so that I think we may leave it out of consideration.

Chromogenic Bacteria.

A tolerably widespread view attributes the green color of the enamel-cuticle to the presence of chromogenic bacteria. The microscopic examination gives no definite support to this view. It is true that we find bacteria and groups of bacteria which have a greenish tinge, but they give the impression that they themselves have been stained rather than that they are the cause of the staining. We shall see farther on that the bacteria in the enamel-cuticle of copper-workers likewise often assume a greenish color from the action of copper.

There are many kinds of bacteria which appear colorless themselves, while they impart a color to the surrounding medium. The color therefore appears as a product of the decomposition of the organic matter in which the bacterium proliferates. Bacteria of this kind have been found in the mouth, although it has not been possible as yet to trace any connection between them and green-stain.

All attempts to cultivate either green bacteria or bacteria which produce a green coloring-matter have until recently been without success. A short time ago, however, I succeeded in obtaining a micrococcus from the green deposit on a milk-tooth, which produces a gray-green coloring-matter on glycerin agar. It remains to be seen whether artificial green-stain may be produced by its help.

A definite solution of the question of the possible relation of chromogenic bacteria to green-stain is accordingly at present impossible.

I have nearly always found green-stain associated with the white cheesy deposit upon the teeth (materia alba of Leeuwenhoek), and am inclined to believe that it is chiefly produced in connection with this deposit, although the latter may not necessarily be present at the time of examination. Thus I have seen in asylums children with well-kept teeth showing green-stain, but have always found that such teeth had formerly been poorly kept. The stain once formed may remain for years, or even indefinitely, even after the patient has acquired the habit of carefully brushing the teeth at least once a day. I recently saw a case where the teeth had been stained by copper fifteen years ago, and did not lose a trace of their discoloration in all the fifteen years in which the patient had in nowise been occupied with copper.

In other cases the green line extending along the labial margin of the approximal surface presents very much the appearance of being a deposit from the mucus stagnating between the teeth.

Derivatives of the Coloring-Matter of the Blood.

If a current of sulfuretted hydrogen is conducted through fresh blood or a solution of oxyhæmoglobin in the presence of air or oxygen, sulfomethæmoglobin is formed, which is greenish-red in concentrated solutions and green in dilute solutions.

If we lay a freshly extracted tooth in a mixture of meat and saliva so that a part of the enamel surface remains free, and moisten this surface with blood, it will take on a dirty green color if kept at blood temperature in an absolutely moist condition for twenty-four to forty-eight hours.

This deposit does not adhere firmly to the tooth, but by immersing teeth for two to four days in a mixture of saliva and bread so as to produce a slight dissolution of the enamel-cuticle, and then prolonging the treatment indicated above, a slight penetration of the enamel-cuticle seemed to take place, so that when it was dissolved away by means of a ten per cent. solution of hydrochloric acid the coloring-matter still adhered to it, and presented, under the microscope, an appearance quite like that which we find in ordinary cases of green-stain.

I think it is, consequently, quite possible that the dirty green deposits which form in putrid conditions of the mouth, in stomatitis mercurialis, scorbutica gangrænosa, etc., or even in inflammatory conditions of less importance, as well as in cases of absolute neglect of the care of the mouth, may owe their green color to the presence of sulfomethæmoglobin.

I am scarcely able to offer an opinion as to whether the body in question is in any way concerned in the formation of the typical green-stain as seen on the labial surface of the front teeth.

The spectroscopic examination of a number of cuticles, isolated by a ten per cent. solution of hydrochloric acid, failed to reveal the presence of sulfomethæmoglobin ; but as I subsequently discovered that the absorption bands produced by solutions of this substance disappear on addition of hydrochloric acid, this result loses its significance. Spectro-microscopic examination of green-stain *in situ* by reflected light also gave negative results.

The insolubility of green-stain, furthermore, appears to argue against sulfomethæmoglobin, the latter being readily soluble ; but we know that soluble coloring-matters sometimes form insoluble compounds with organic tissues. The exceedingly delicate test for blood or oxyhæmoglobin—the formation of hæmin crystals when heated with glacial acetic acid and a trace of common salt—is not applicable to sulfomethæmoglobin.

Soluble green coloring-matter is, however, very commonly met with in the mouth where accumulations of white tartar press upon the gums ; particularly if the latter are much inflamed thereby, the under surface will be found to have a greenish or greenish-brown color which is readily soluble in water.

Relation of Different Food-stuffs to Green Deposit.

Tomes expresses the view that green-stain is of vegetable origin; Ottolengui, that it arises from the fermentation of traces of milk which remain sticking to the teeth. An examination of the few herbivorous and carnivorous animals which were placed at my disposal furnished no evidence in support of the view that the stain is of vegetable origin. It is well known that in herbivorous animals we almost universally find thick, hard deposits of a black or bronze-black color, while green or greenish deposits are unknown, to me at least. Deposits on the teeth of carnivora are comparatively rare, though the teeth of old dogs will often be found in this respect in as bad a condition as those of many human subjects. These deposits have a brownish to greenish-gray and occasionally dirty green color, and do not adhere firmly to the teeth.

No more was I able to find any facts in support of the milk theory. In an orphan asylum at Rummelsburg (near Berlin) I examined the teeth of one hundred boys. They showed the customary percentage of green-stain, although milk, excepting a slight amount in their coffee, was excluded from their rations.

In a second asylum where some of the children drink milk and the others not, I did not observe any difference in the frequency of the green deposit. I was not able to trace any connection between green-stain and medicines.

Other deposits of an organic nature, brick-red, reddish-brown, brown, or yellow, are occasionally met with in the mouth. They do not adhere firmly to the teeth, and consist of accumulations of chromogenic bacteria.

Fuller details concerning these have been given in my book on the "Micro-Organisms of the Human Mouth," and need not be repeated here.

Green Tartar.

I have called attention to the fact that when accumulations of tartar at the neck of the tooth press upon the gums, the under surface will be more or less discolored, according to the degree of irritation of the gums.

The color, which is an intermixture of brown or reddish-brown, with varying quantities of green, is attributed to the presence of sulfomethæmoglobin. We frequently find just under the margin of the gums an annular incrustation of hard tartar of a greenish-black color, while teeth which have become loose through chronic diseases of the pericementum show the whole root for one-half to three-quarters the distance to the apex coated with a similar deposit having a nodular surface and more or less pronounced green color. On old abscessed roots the very apex will sometimes be covered with nodules of a similar deposit, which in this position, as far as I have observed, appear always brown or reddish-brown.

This deposit has been called sanguinary calculus, under the assumption, which in part is probably right, that the incrustation is deposited from the blood and not from the saliva.

Peirce (*Internat. Dent. Jour.*, January, 1894) reports as the result of examinations made by Congdon the presence of the urates of lime and soda in these deposits, and attributes their formation to the existence of a gouty diathesis in the subject.

Sections of the decalcified deposit under the microscope show a marked diffuse yellowish- or brownish-green color. Whether the color is due to iron, which may always be found in traces, at least (in form of the sulfid), or to sulfomethæmoglobin, or, finally, to some other agent, I have not been able to decide. The disastrous effects of the deposit are well known.

The Metallic Deposits and their Relation to Green Deposits.

1. Copper and Its Alloys.

The observation has been repeatedly made that the teeth of copper-workers, as a rule, show a more or less pronounced greenish discoloration, though I have not been able to find any reference to this fact in dental writings dealing with the subject of green-stain. Nor am I aware of any attempt ever having been made to determine the character of this discoloration.

In the greenish or reddish-green hair of copper-workers, Laugier found copper as early as 1825. The copper line on the gums has also been repeatedly referred to in works on copper-poisoning. This consists of a red to purple-red or sometimes greenish-brown (Hirt) line near the margin of the gums ; it is produced partly by the hyperæmia of the irritated gums, and partly by the more or less oxidized or otherwise chemically changed particles of copper which have worked their way into the gums, or been driven into them, as in hammering copper. This line is not always present.

After having ascertained that the copper stain might be produced artificially by the action of dilute organic acids, bread-saliva mixtures, etc., on copper dust, I obtained permission to examine nearly two hundred workmen in copper, bronze, brass, etc., at one of the largest Berlin work-shops. Among over one hundred and fifty who had worked with brass, copper, or bronze for more than a year, there was not a single one who did not show more or less of green-stain on the upper teeth, the color varying from green to dark dirty green, reddish-green, bluish-green, greenish-blue, bluish-purple. The latter colors predominated in the rooms where "phosphor-bronze" was worked. The air here becomes so saturated with the fine dust that the flames burn bluish-green, and consequently it is not to be wondered at that the managers as well as the workmen often have the same discoloration of the teeth ; likewise all who are obliged often to enter the room, even the messenger boy. The deposits on the upper teeth were by far more extensive than on the lower.

In this connection it may be noted that trumpeters very often show a discoloration of the teeth, presumably brought about by contact of the teeth with the brass mouth-piece.

Teeth filled with copper amalgam often show a greenish surface discoloration, extending sometimes upon the neighboring tooth. I have also occasionally seen teeth in the upper jaw with green-stain produced by contact with a copper amalgam filling in the antagonizing tooth.

Test for Copper on the Teeth.

The presence of copper or its alloys on the teeth may be most easily determined by calcination. The deposit being confined to the surface of the enamel, and undergoing no dilution whatever by the process of burning, it is possible to detect very minute quantities by the formation of the red oxid of copper. I have found that 0.0000002 gram of the sulfate of copper on the smooth enamel surface leaves traces on burning, which are readily visible under the magnifying glass, if not to the naked eye.

The tooth having been calcined in the manner before described, the enamel is taken upon a loop of platinum wire and held directly, for one to two minutes, in the flame of a Bunsen burner; a black or reddish-black color in the oxidizing flame, and a brick-red to cherry-red color in the reducing flame, indicate copper.

Iron and manganese act somewhat differently, as will be seen below; they may also readily be excluded by the tests given under these substances.

In one case where the deposit was very thick, I was able to obtain the characteristic green copper flame by removing the deposit with a sharp instrument, moistening with hydrochloric acid, and holding it in a small colorless flame on a loop of platinum wire.

The usual manner of separating copper from organic matter by means of electrolysis, as well as the method of treating the calcined matter with warm dilute hydrochloric acid, filtering, reducing the acidity by addition of ammonia, and precipitating the copper by a current of sulfuretted hydrogen, is unnecessarily complicated for the purpose, and the latter method, in particular, gives uncertain results. I observed no deleterious action from the presence of copper or its alloys on the teeth.

2. *Iron.*

Of all metals, iron performs the most important part in the physiology of life. It is widely distributed in nature, and forms an essential constituent of the animal body as well as of many plants. It is consequently being constantly taken into the mouth in minute quantities along with the food, to say nothing of its use in form of medicines.

Moffat unreservedly pronounces iron to be the cause of green-stain, but does not state upon what grounds he bases his belief.

We know that iron, in connection with organic matter, may under certain conditions produce a dirty green or black-green color. According to Hoppe-Seyler, iron in the fæces in the form of the monosulfid (FeS) gives rise to a green to black color. I gave two mice large quantities of ferrum reductum. On the following day the contents of the *large intestines only* were intensely greenish- to bluish-black.

Test for Iron on the Teeth.

We possess an exceedingly delicate test for iron, by means of which we are able to determine the presence of minutest quantities on the teeth.

The tooth to be examined is brushed in distilled water and placed for ten to twenty hours in a two per cent. solution of the ferrocyanid of potassium, then for about a minute in a two per cent. solution of chemically pure hydrochloric acid. Where iron is present, Prussian blue will be formed. I have determined experimentally that the presence of 0.0000016 gram of the sulfate of iron on a smooth enamel surface may be made evident by this reaction. Very small quantities of iron may also be detected by calcining the tooth in the manner already described ; 0.000003 gram of the sulfate leaves, on burning in the oxidizing flame, yellowish-brown traces of the oxid of iron, readily visible under the magnifying glass.

In normal teeth, iron is constantly found in the vascular tissues, pulp and pericementum ; also in the enamel-cuticle, whether as a normal constituent or as a precipitate from the saliva I am unable to say.

Only exceptionally could I detect iron in the enamel and dentine of human teeth, but the enamel of the incisors of many rodents contains much iron in the form of oxid. The color in these cases varies from yellowish to yellowish-brown, yellowish-red, brown-red.

If carious teeth are split open and the halves treated with the ferrocyanid of potassium as explained above, they usually develop a crescent-shaped blue line about one-half to three-fourths millimeter in width just on the boundary between the carious and normal dentine, showing that a deposit of iron has there taken place.

We often also find iron on the normal margins in cavities of decay, as well as in fissures on the grinding-surface.

Theoretical considerations furnish very little evidence in favor of the view that green-stain may be produced by iron. Many salts of iron (ferrous salts) have a green color, but in the presence of air and moisture they quickly undergo oxidation, and are thereby converted into the yellow or red ferric salts, so that a green iron compound could hardly exist on the surface of the enamel for any length of time. (The ferrous lactate, as suggested by Peyser, would first receive consideration.)

All attempts to produce iron deposits artificially by action of food-mixtures on particles of iron under access of air lead to the formation of yellowish-brown or reddish-brown colors.

I furthermore found, on examining the teeth of some one hundred and fifty iron-workers, that nearly all who had worked in iron for a greater length of time showed brown spots or deposits on the teeth, and, curiously enough, these iron deposits occur, in contradistinction to the copper deposits, oftener on the lower teeth than on the upper. They give a very distinct iron reaction (Plate, Fig. 23).

In the cases of ninety-six men who worked with iron exclusively, the color of the deposit on their teeth was designated as follows :

In twenty-three cases, brown ; in nineteen, light brown ; in twelve, dark brown ; in three, yellow-brown ; in five, brown-black ; in ten, reddish-brown ; in nineteen, brown with green tinge ; in five, no discoloration.

One must not, however, pronounce every brownish stain on the teeth as iron. Brown and reddish-brown deposits of bacterial origin are also sometimes met with. In the nineteen cases where the greenish tinge was present, it is not necessary to infer that it was produced by iron. In some cases I found that the men had previously worked with copper or some of its alloys, and in others the stain may of course have been of organic nature.

According to Lewin, the teeth of persons who continue the use of iron preparations for any length of time become blackened by the formation of the sulfid of iron.

An iron wire was bound around a central incisor in my own mouth and allowed to remain for three days, during which time the teeth were not brushed. On the third day the tooth was very decidedly bluish-black. On being touched with the solution of ferrocyanid of potassium, followed by hydrochloric acid, it became light blue, showing that the discoloration was due to iron. The wire itself was black (sulfid of iron), with reddish spots (hydrated peroxid of iron).

Finally, something like seventy-five teeth with green-stain were tested for iron by the potassium ferrocyanid test. Some were tested *in toto*, of others sections were prepared which were mounted and examined under the microscope. Twenty-five were calcined and then tested for iron.

The result of the test was the same throughout. In no case did the stained parts give a stronger iron reaction than the unstained. On the contrary, it repeatedly occurred that the colorless surface took on a distinct blue tinge, while the green parts remained unchanged.

The twenty-five teeth examined by calcining gave no evidence of a deposit of iron in the stained parts.

All these results appear to justify the conclusion that iron can scarcely be an *important* factor in the production of green-stain.

Action of Iron upon the Teeth.

In regard to the action of iron upon the teeth, we are safe in concluding that all preparations of iron which have an acid reaction may act deleteriously.

A more interesting question is whether iron itself, apart from any acid reaction, has any effect upon the tooth-substance. We know that iron nails in wooden structures subjected to the action of air and moisture become loose in the course of time, the wood around the nail being gradually destroyed; also, iron-spots on linen or bibulous paper kept moist make them brittle, and lead to the formation of holes. This action is attributed to a process of alternating oxidation and reduction (*Binz*), the iron taking up oxygen from the air and giving it over to the organic matter with which it comes in contact, by which the latter becomes oxidized or burnt.

Whether iron has a similar action upon the teeth can be determined only by experiment. I have implanted a number of iron and wooden pegs in teeth, which shall be kept for some weeks or months in a moist condition. In this way the question may possibly be answered. The enamel-cuticle of a tooth which had been for some weeks under the action of iron appeared exceedingly brittle, and fell to pieces on being removed. The enamel appeared unchanged.

I did not notice any marked action of the iron upon the teeth of the workmen whom I examined, though at that time I was looking for green-stain only, and, besides, in most cases the teeth were so coated with tartar that the iron filings could not come into direct contact with the enamel.

Various Observations on Calcining Teeth.

1. On burning perfectly normal teeth, we repeatedly observe the

appearance of a very delicate pink color on the enamel. Gabriel (*Zeitschr. f. Physiol. Chemie*, Bd. xviii, Heft 3, 4, 1893, page 299) observed the same phenomenon. No explanation has been found for this singular appearance, though we must suppose that there is a minute quantity of some metal hitherto undetected in the enamel.

Metals of the cerium group, according to Gabriel, are excluded.

In this connection, I call attention to an important observation for which we are indebted to Gabriel. He found that the inorganic substances of the dentine contain water in three forms: (*a*) as tissue-water, which evaporates at ordinary temperatures (drying), but is completely driven off only after an exposure to 100° C. for some hours; (*b*) as water of crystallization of the mineral substances of the teeth. This may be driven off by a temperature of 300° to 350° C.; (*c*) as water of constitution, which cannot be expelled by heat at all, except in the presence of silicic acid. The water which goes off at 300° to 350° C. is put down as *loss* in analysis.

2. Both dentine and enamel melt together to a glossy body in the oxyhydrogen flame.

3. Polished surfaces (erosion) retain their polish on calcining,—*i.e.*, the polish pertains to the inorganic constituents of the dentine. The slightest action of acids destroys the polish, a fact which may be made use of in studies of erosion.

4. The enamel-striæ are rendered more distinct by calcining.

5. On heating the tooth to a dull red heat, the enamel-cap becomes loosened and may be readily removed. We may in this way easily isolate the dentine for purposes of study or demonstration.

3. Manganese.

Manganese is a substance which has many points of similarity with iron. It occurs rather widely distributed in nature, and is to be found, in company with iron, in both vegetable and animal tissues. It may, consequently, be worth our while to inquire into the possibility of manganese forming a constituent of the deposits on the teeth, particularly as it has already been found on the teeth of ruminants.

We possess a very simple and easily applicable test for manganese, which admits of detecting very minute quantities. A bead of soda and saltpeter on a loop of platinum wire acquires a dark green color in the oxidizing flame, if traces only of a compound of manganese are present, through the production of the manganate of potassium. On cooling, the bead appears blue-green, and dissolves in water to a greenish solution, which becomes red or reddish on the addition of nitric acid.

I have found manganese almost constantly in the shining black deposits on the teeth of herbivorous animals; among others, in the elephant, rhinoceros, dromedary, elk, deer, cow; and also in the bronze-colored deposits on the teeth of the horse, and in traces in some other animals: wart-hog, etc. A very distinct reaction was also obtained from the dull black deposit on the teeth of a gorilla. Black deposit from the teeth of a sea-cow gave no reaction for manganese.

Where the amount present is not too small, it produces a brown red color on calcining, due to the formation of manganomanganic oxid (red oxid of manganese). I have not been able to find manganese in the deposits on human teeth, although I have not as yet been fortunate enough to obtain strict vegetarians for examination.

It is also possible that the alkaline saliva of animals is necessary to the formation of this deposit.

4. Mercury.

The presence of mercury, or compounds of mercury, on the teeth or in the tooth-substance may rationally be expected :

1. In all teeth filled with amalgam, or treated with preparations of mercury.

2. In all cases where mercury, or any of its preparations, is incorporated into the body and reappears again in the saliva.

It is a long-known fact that mercury very soon reappears in the saliva, and Fallopia (1562) recommended, in cases of mercurial salivation, to hold a gold coin in the mouth, which is to be taken out after a certain length of time, and heated, in order to drive off the mercury, and then reinserted. By repeating this proceeding, one could free the mouth from mercury.

3. In cases where mercury is inhaled in a fine state of division.

4. Where strong sublimate solutions are used as mouth-washes.

Schlencker observed, in a case of severe mercurial poisoning, an excretion of mercury through the tooth-pulps, the dentinal tubules being filled with mercury two-thirds of the way from the pulp-chamber to the periphery of the dentine, so that they appeared, under the microscope, absolutely black.

We frequently meet with the statement that teeth, in mercurial poisoning, show a dirty green deposit. It has not, however, been shown that this discoloration is due to the presence of any compound of mercury, although the conditions must be acknowledged favorable to the formation of the sulfid of mercury, and this substance *may* have various colors,—among others, green. I think it more probable, however, that the discoloration is in great part due to the formation of sulfomethæmoglobin.

The usual antipathy to the tooth-brush as a normal condition in such subjects, or as a result of the sensitiveness of the gums, the frequent bleeding of the teeth, the putrefactive processes in the mouth, as shown by the *fœtor ex ore*, render the formation of sulfomethæmoglobin a matter of necessity.

Notwithstanding repeated promises, I have not yet been able to obtain teeth from severe cases of mercurial poisoning, such as occur in manufactories through prolonged inhaling of mercury in form of vapor.

A number of teeth, chiefly from syphilitic patients undergoing mercurial treatment, gave the following results :

1. Syphilis, mercurial treatment ; stomatitis mercurialis ; tooth showed no deposit and no discoloration ; test for mercury negative.

2. Syphilis, treated by injections ; extraction after thirteenth injection ; tooth grayish- to brownish-green.

3. Syphilis ; stomatitis mercurialis ; after seventeen injections, no discoloration of note ; test uncertain.

4. Syphilis ; stomatitis mercurialis in third week of treatment ; teeth all greenish-gray ; test negative.

5. Mercurial poisoning, unknown origin ; thick black-brown deposit, reddish-brown at neck (Plate, Fig. 17) ; test positive.

6. Case of prolonged use of calomel; all the teeth have a thick, shining, black deposit (Plate, Fig. 16); test for mercury very distinct.

I have been informed by Dr. Lewin that black deposits very commonly result from the use of calomel, but I have seen no references to this fact in the text-books. If iodid of potassium is given where deposits of mercury are present on the teeth, the formation of the iodid of mercury might readily give rise to a greenish color, as it has been repeatedly observed in other parts of the body.

5. Lead.

One of the most important symptoms of chronic lead-poisoning is the characteristic discoloration of the mucous membrane of the mouth, and, in particular, the formation of the so-called lead-line, a band about four to five millimeters broad along the margin of the gums, produced by the sulfid of lead, variously described as slate-gray, blue-black, or pale violet, the latter color sometimes extending over the entire gums (Hirt).

My few investigations in cases of lead-poisoning were directed to the teeth themselves, and to the manner in which they are affected.

I have had the opportunity to examine only four lead-workers, none of whom showed any characteristic appearance on the teeth whatever. They were all healthy men, however, with none of the symptoms of the lead dyscrasia.

Hirt, on the other hand, found in chronic lead-poisoning a marked discoloration of the teeth, which appeared dark brown at the necks and light brown on the crowns, sometimes with a trace of yellowish-green. The gums recede, and the teeth gradually become loose and fall out.

We have an exceedingly delicate test for lead in the formation of the black sulfid, on passing a current of sulfuretted hydrogen through the solution.

Lehmann was able to detect the nitrate of lead in a solution of 1 : 10,000,000. In my tests I employed the method of Lewin (*Deutsche Med. Zeitung*, No. 12, 1883). The tooth to be examined is treated in a test-tube with hot nitric acid till the enamel-cuticle and deposits on the tooth are completely dissolved away. The solution is then poured off and an excess of egg-albumen added, followed by caustic soda. On boiling, sulfur is set free, and, if lead is present, the black sulfid of lead is formed.

Five teeth from as many cases of lead-poisoning gave the following results:

1. No discoloration. Test negative.
2. No discoloration. Test negative.
3. Upper incisor with a thick dull black deposit on the labial surface (Plate, Fig. 15). All the teeth in the mouth showed the same appearance. Test positive, though not pronounced.
4. Thick dirty green deposit. Test negative.
5. Thin greenish deposit Test negative.

The amount of material examined is, however, too small to admit of conclusions.

The deposits upon the teeth produced by lead seem to be very slight, especially when compared to those produced by copper and its alloys.

6. *Nickel, Silver, etc.*

The most of the compounds of nickel have a green color, a few of them are blue, the sulfid brown-black.

Metallic nickel is slowly attacked by the fluids of the mouth and by mixtures of bread and saliva, whereby a greenish color is produced.

We might, therefore, be prepared to expect greenish to brown-black deposits on the teeth of nickel-workers. Fig. 14 of the plate represents the tooth of a worker in nickel, and shows a very thick, opaque bluish to greenish-black deposit. A chemical examination of the deposit was not made.

Guipon (Lewin, "Nebenwirkungen der Arzneimittel") observed a discoloration of the teeth after prolonged use of argentum nitricum, and at the same time stomatitis without salivation (gingivite argentique of Magitôt). The cause of the discoloration has not been examined into.

I have seen but some half-dozen workmen in tin and zinc, all of whom showed nothing characteristic on the teeth.

Effects of Green-Stain upon the Teeth.

Opinions differ widely as to the action of green-stain upon the teeth. Robinson, Harris, Leber and Rottenstein, Fox and Harris, Baume, Brandt, Ottolengui, Schlencker, and others assign to green-stain a more or less injurious action upon the enamel. Nessel, on the other hand, affirms that this view is contradictory to experience, and is supported in the opinion by Bastyr. Tomes and Wedl do not express positive views one way or the other.

In regard to the copper-stain I am not able to express a definite opinion, as I neglected to pay especial attention to this point in my examinations. I recall, however, nothing in the appearance of the teeth which would indicate an eroding action on the part of the stain. The teeth which I obtained for purposes of examination were, almost without exception, such as had been extracted on account of approximal caries, and were sound on the labial surface.

In reference to the green-stain of children's teeth, I have given more attention to this question, and after an examination of at least two hundred cases I have become convinced that the idea that green-stain is something that eats into the substance of the tooth has been much exaggerated. It always remains restricted to the enamel-cuticle, and does not encroach upon the enamel, every trace of the stain peeling off along with the enamel-cuticle when the tooth is acted upon by acids. Pits, fissures, grooves, or scratches on the surface of the tooth predispose to the deposition of the green-stain; likewise a surface roughened by the action of acids. This has led some to suppose that the stain was the cause of the roughness, while, as a matter of fact, the sequence has been just the opposite.

Scores of teeth with green-stain have passed through my hands, to say nothing of those that I have seen in the mouth, and I have found cases of caries of the labial surface associated with green-stain certainly not more frequent than where green-stain is not present.

If sections of teeth with green-stain are examined under the microscope, we occasionally find that the enamel has been acted upon in the manner shown in Fig. 7, though I have rarely seen the effect as marked as in this case. It is easy enough, however, to find the same appearance due to a superficial calcification and pigmentation in teeth which have no green-stain, so that we have no right to assume that the decalcification has been produced by the stain.

DESCRIPTION OF PLATE.*

FIGS. 1–4. Upper incisors of a man after an attack of typhoid fever.

FIG. 5. Cuspid of a brass-worker.

FIG. 6. Cuspid of unknown origin, with dirty green, probably organic deposit.

FIG. 7. Cuspid of a twelve-year-old girl with pericementum, in consequence of a pulpitis totalis. Reddish discoloration of the dentine ; green deposit of organic nature.

FIG. 8. Upper lateral incisor of a bronze-worker.

FIG. 9. Arch-shaped green-stain on an upper milk incisor, extending upon the approximal surface.

FIG. 10. Diffuse stain on upper milk cuspid.

FIG. 11. Fine specimen of an upper cuspid of a brass-worker.

FIG. 12. Upper incisor of a workman in phosphor-bronze, bluish-green stain.

FIG. 13. Upper bicuspid of a brass-worker, with light-green stain on buccal and approximal surfaces.

FIG. 14. Tooth of a nickel-worker, mixed color: bluish, greenish-black. On the lingual side where the stain is very thin, the color was plainly indigo-blue.

FIG. 15. Upper incisor of a lead-worker, suffering from lead-poisoning.

FIG. 16. Reddish-black (on the buccal side jet-black) bicuspid after prolonged use of calomel. All teeth in the mouth showed the same appearance. Test for mercury very distinct.

FIG. 17. Upper incisor from a case of mercurial poisoning ; thick, grayish-black deposit on crown ; reddish deposit on the roots.

FIG. 18. Tooth of a confectioner with chocolate-colored deposit.

FIG. 19. Reddish-black copper stain on incomplete oxidation, composed of a mixture of red and black oxid of copper.

FIG. 20. A piece of enamel from a green tooth of a copper-worker after treatment in the flame of a Bunsen burner (red or suboxid). × 2.

FIG. 21. Iron-stain on the enamel after treatment in the oxidizing flame. (Peroxid of iron.)

FIG. 22. Piece of an isolated enamel-cuticle, yellowish and brownish, dirty-green discoloration. Deposit of the coloring-matter in the enamel-striæ. × 75.

FIG. 23. Brown deposit on the tooth of an iron-worker after the potassium-ferrocyanid reaction. The blue spots consist of Prussian blue ; the brown and brown-red ones of oxid of iron. × 75.

PHAGEDENIC PERICEMENTITIS AND THE GOUTY DIATHESIS.

BY HENRY BURCHARD, M.D., D.D.S., PHILADELPHIA, PA.

THE gouty or uric-acid diathesis is here defined as a condition in which an excess of uric acid in the circulating fluids causes manifestations of altered function and structure in various organs.

From the time of Hippocrates, gout has been assigned as a cause for any and every obscure malady for which no other explanation could be had. The affection is certainly as old as luxurious civilization ; especially common, as we have abundant evidence to show, among the Romans during the Empire. Physicians in all ages have essayed explanations as to its cause and nature. Until this century medical men appeared to accept that it was due to the circulation of an indefinite something called peccant matter in the blood. What this matter was no one knew,—in fact, had no means of knowing. Before the time of Garrod, the greatest step toward any definite knowledge of the subject was the discovery of certain specific therapeutic properties of colchicum.

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*I have to express my thanks to Mr. Mummery, of London, and Zahnarzt Dieck, of Berlin, for their assistance in executing the colored drawings.

Garrod demonstrated conclusively the presence of an excess of uric acid or urates in the blood, and that this had constant associations. The discovery of this fact by no means ended dispute, but all are agreed as to the one distinguishing feature. Views as to its origin and mode of action, or rather the exact pathology of its production, are even to-day many and varied.

All authors are united in opinion as to the important or prominent part played by heredity as a cause. This is the predisposing element in from forty to eighty per cent. of causes, according to different writers. Most common in males, probably because they are more subjected to the conditions tending to the production of active manifestations of the disorder. The female having a gouty ancestry is more likely to be the victim of rheumatoid arthritis (rheumatic gout, arthritis deformans—Geo. B. Wood, Niemeyer, Da Costa, *et al.*).

Heredity in disease is here regarded as an expression of transmission of a *type of tissue*,—that is, a lessened vitality or resistance exists somewhere, and to that extent a morbid condition is present; a fitting soil for the development of some specific disease is inherited, and the existence of that soil is a predisposing element to the specific malady. Aside from the large percentage of hereditary cases, we see a latitude of from twenty to sixty per cent. for the development of non-hereditary cases. Common experience would seem to indicate that it is with the hereditary cases we find a predisposition to phagedenic pericementitis. The most potent element as an exciting cause for the gouty condition is a greater ingestion of certain materials than can receive proper disposition in the economy. All appear to agree in this particular. From this the view to-day inclines toward the theory that it is primarily a question of faulty food metabolism, rather than an expression of an incomplete retrograde tissue-metamorphosis. Perhaps the fact of splenic disorder attending the diathesis will lead to clearer theorizing as to its origin. These ingesta are an excess of nitrogenous food, principally beef, and consumption of malt liquors, sweet or heavy wines, in too great quantities—the effects of the latter apparently severe in direct ratio to the specific gravity of the fluid. It is noticed that great beef-eaters are ready victims. Perhaps it is that a greater volume of beef is eaten than of any other meat in a given time, or at one meal, its ready digestibility requiring from one-half to three-fourths the time needed for the gastric digestion of any other form of flesh, this throwing in a comparatively short time an inordinate amount of work upon the absorbent system more than can be fully transformed by the elaborating organs or tissues. Until the exact mode of derivation of uric acid can be determined, the problem must remain without definite solution. Certainly uric acid is present in increased amounts.

There are other products of defective oxidation of nitrogenous matter, such as xanthin, which are capable of forming calculi; but what part they may play in the economy as irritants is but indefinitely known. Any attempt to explain the phenomena, the course of this disease (phagedenic pericementitis), when regarded as an affection arising from purely local causes, results in failure. Why a disease should affect certain individuals alone, a species of degeneration accompanied by deposits, which have but an unsatisfactory explanation, leads naturally to a conviction of some constitutional state existing as a predisposing element to the disease.

The problem, then, is to find a cause which will explain a degeneration of articulative tissue, accompanied by deposits evidently not arising from the saliva, and which in its action is confined entirely to the retentive apparatus of the teeth. In the practice of medicine but two diseases are known which act in this manner upon articulations ; these are gout and rheumatism, both diseases arising from the retention of waste products in the economy. Lithæmia is here included as a variety of the uric-acid diathesis. The phenomena of both diseases are produced by the action of irritating materials. Whatever knowledge we may hereafter attain as to the action of other waste products, at present our pathological acumen is confined to these two. Rheumatism does not have the morbid anatomy for correspondence with phagedenic pericementitis. The variety known as rheumatoid arthritis is a constructive degeneration ; that of true gout, essentially destructive. Cases of pericementitis have been recorded whose history is identical with that of rheumatic gout, but their course differs from that of the disease called by Professor Black, phagedenic pericementitis, or by Professor Peirce, hæmatogenic calcic pericementitis.

Even here it must be remembered many cases of arthritis deformans have a distinctly gouty history,—an expression of hereditary gout in the female. The distinguishing feature of the gouty, the pronounced unmistakable gout, is the deposition of waste material in articulative tissue or in any of the connective-tissue group.

Attention is to be called to the fact that the alveoli and teeth form peculiar articulations. The pericemental membrane is a periosteum, and is the ligament binding the two structures together ; a source of nutrition, and the means of retention. As this membrane belongs to the group of tissues toward which the deposits of gout have a selective action, there is no reason why it should not be the seat of gouty disease, and no doubt it is.

That many medical writers have not pointed out the association of this degenerative process of the pericementum with the uric-acid diathesis is but another evidence of the scanty dental knowledge possessed by the general practitioner. His non-recognition is by no means proof of non-existence. It would appear that the physician at large, in viewing matters pertaining to dentistry, becomes possessed of a species of anatomical and pathological myopia, which requires for correction dental lenses.

In the dense structures of articulations, the seat of deposits, there is more or less molecular necrosis. In organs possessing a looser stroma there are anatomical reasons why cirrhosis rather than necrosis should result ; the deposits acting as irritants, the connective tissue of the organ develops at the expense of the parenchyma. On the roots of teeth we find frequently not only the destruction of the pericementum, but there are evidences of a degeneration of the cementum itself, a loss of substance in places.

Pure urates are white or yellowish white. Cranstoun Charles states that impure urates are discolored from yellow to brown. The likeness of phagedenic pericementitis to gout in another joint consists in the loss of interarticular substance ; frequently the place being occupied by a deposit of crystalline material, demonstrated in cases to be urates by Dr. Peirce. Micro-organisms, probably always necessary to the formation of pus, are more rationally considered as accidents. A fitting soil is present for their development ; the disease as disease very probably exists before their ingress, in many cases.

While the conditions necessary and resulting from the formation of pus aid in the process of destruction, they need not be essential to the disease process *per se*. They cause one of the common symptoms of phagedenic pericementitis, the pyorrhea. Who has not seen cases where there is evidence of rapid, decided disease process, and yet without pus? There is sanies, but no evidence that this has a necessary origin in the action of micro-organisms. Aside from these agents producing pus, there is no good evidence for assigning them as holding causative relation in the disease.

Pyorrhea of phagedenic pericementitis is the analogue of the ordinary trophic abscess of gout. Ebstein's theory, "that gout is a nutritive disturbance, first leading to necrosis, and this followed by a deposit of urates in the necrotic area," is complete, at least as far as the disease involves cartilaginous and osseous structures. It would seem this is the process in phagedenic pericementitis where there are deposits.

It is a common observation that the dental disease under consideration attacks almost always dense, hard teeth, the variety which becomes the subject of pulp-calcification, teeth which resist the causes of dental caries. That these teeth do increase in density is evidence that the calcific function is active in these parts. Their attachment will be to firm, hard alveolar process, forming an articulation which admits of but little movement, and this, lessening with age. As the process increases in density, the thickness of the articulating membrane and the areas of the nutrient vessels decrease. Function corresponds with structure, and such teeth with the bases of support are designed for hard, vigorous use. Now, the balance of health in any organ is maintained no longer than the persistence of an equilibrium between attack and resistance. One of the ordinary sources of debility is disuse ; insufficient use is but a form of this. Gouty patients are frequently gourmands. Many of them, although they may not "ghost" the table, are given to the use of food requiring too little mastication. In this connection it is doubtful whether ninety-nine per cent. of persons give their dental organs sufficient use. The result of this will be a greater or less degree of debility in the unused parts ; they come at least to an atonic state. The mechanical action of mastication is an aid to the circulation in the alveolar dental membrane ; the elastic reaction of the articulation tends to pump the circulating fluids. Lessen this alternating action and reaction, reduce its vigor, and to that degree there arises a sluggishness of the local circulation. Thus we have a part whose blood-supply is lessening with age, and whose vitality in many instances is becoming debilitated through insufficient use.

From the accepted definitions of life we deduce that it is questionable, if not impossible, for a perfectly healthy structure to become the seat of disease; for morbid action to arise, there must be some fault of adjustment. Disease attacks first a weak part; rather, a weak part permits the growth, development, or residence of the causes of disease; therefore all weak parts are in constant danger. These teeth and their retentive apparatus becoming less and less vascular, are more readily affected by any interferences with the blood-supply. Stoppage of the circulation here threatens necrosis, where in a more cellular structure there would be sufficient elasticity to permit of a return to normality. According to Ebstein, in gout necrosis precedes deposit. It is probable, if not necessary, that arterial change precedes necrosis. An early stage of angiomatous inflammation is swelling of the intima; this would impede the ingress of blood from the arteries and its egress through the veins. We have, as consequence, stasis in the area involved. The gouty exudation having lessened, alkalinity will meet the acid product in the intercellular spaces, and the urates, insoluble in acids, precipitated. No matter if the circulation be re-established, it is extremely improbable that the blood would redissolve and reabsorb them.

That a reabsorption does take place at times and in places, we know; know also that the process is aided through the use of lithium salts. Applied to phagedenic pericementitis, it is certain in this disease that we have a degeneration of the alveolar dental membrane, ranging from inflammatory degeneration, retrograde metamorphosis, to coagulation-necrosis, the degree varying according to the amount of interference with the circulation. The terminal vessels are the first attacked in gout, or, at least, the results are more evident from their involvement. This would account for the molecular necrosis at the margins of the alveoli. Interference has been here with the lateral blood-supply to the pericementum. Deposits such as described by Dr. Peirce would obstruct the circulation supplied by the apical arteries. The disease may begin upon or in any part of the membrane, depending upon the vessel or vessels first affected. Dr. E. C. Kirk has in his possession a superior lateral incisor on which the pericementum has been destroyed from the apex to one-half way to the enamel-border; the remaining portion of the membrane is apparently intact, is certainly so at the part corresponding to the gum-margin. At about a fourth of an inch from the apex is a deposit; having but slight attachment, it has evidently been formed *in* the pericementum. The deposit was accidentally detached and lost, so no analysis was made of its chemical composition. The least vascular parts are the first to suffer. There is no reason why marked discoverable deposits are necessary to the existence of the disease. Any specific cause which could produce continued stasis or obstruction to the blood-flow would be sufficient.

The presence of such a substance as uric acid in excess is all that is required to begin the inflammation in an arteriole or small vein. The presence of lactic acid is cause sufficient for the production of endocarditis,—but another form of angiomatous inflammation. Cases which have deposits are probably always the seat of coagulation-necrosis; cases without deposits, those of inflammatory degenerations. The latter should be a more prolonged process than the former. The presence and growth of micrococci, the special cocci of pus-formation, will hasten an already existent process of destruction. They need be no more necessary to the progress of the disease than they are to the mode of action which extrudes a chalk stone from the finger.

To all intents and purposes gout is an expression of the accumulation in the blood and circulating fluids of what should be waste product,—an excretion, uric acid, regarded as the product of insufficiently oxidized nitrogenous matter. It is not known what tissue or organ is at fault in its production. Certain investigations recorded by Lauder Brunton regarding the functions of the liver lead to the possibility of that organ being viewed as the one. Much has been written upon this particular chemical action, but nothing definite is known.

The dentist is rarely concerned, and seldom sees anything of acute gout. It is before or after the explosive action of the accumulated waste products takes place that he sees it at all. It is fair to assume that if marked gouty symptoms be present, it will be recognized and treated by a physician. The patient would then give the history of such an attack. That many or most of those who are the victims of phagedenic pericementitis do not consider themselves the subjects of the gouty diathesis is evidence that the form in which it will present to the dentist is the masked, the obscure, gout.

To secure proof of this must be through the search of the dental practitioner; that is, cases with which we are confronted are likely to present the complexus of symptoms known as lithæmia,—a disease in which a variety of subacute symptoms mislead as to underlying cause. Garrod's experiment for determining the presence of uric acid in the blood would form a positive symptom. Six minims of acetic acid are added to a fluidrachm of blood-serum, or the liquid obtained from a blister. These are mixed in a clean watch-crystal, and a fine linen thread is immersed in the solution, and it is set aside in a place safe from the access of dust for forty-eight hours. At the expiration of that time uric acid, if it be present, will be found deposited as minute crystals on the thread. The amount may be small, but it must be remembered the amount of uric acid present at any time is not large. Even an increase sufficient to produce an outbreak of acute gout is large only by comparison. The microscope will demonstrate the nature of the crystals. They have certain definite forms; in the main, rhombic or some modification of that shape.

Cranstoun Charles states, "Indeed, every crystalline urinary deposit of a distinct yellow-brown or red color may be said to consist of uric acid." Deposits responding to the murexide test are to be regarded as urates. There are cases having a gouty history the calculi of which do not appear to answer to the murexide test. Whether urates are present in such small amount as to give scarcely the faintest trace of a reaction is a question. In one case for which no history of gout could be had, a deposit gave the murexide reaction. In two others, of undoubted gout, heredity and history of acute outbreaks, deposits gave not the faintest sign of the murexide reaction. One case of Dr. Kirk's, with gout unquestionably present; deposits taken from near the apex were entirely without response to all tests for uric acid; neither he nor I could detect even a suggestion of purple with the murexide test. It might be that minute crystals of urates would form the irritating nuclei around which calculi are formed. There is no reason why this should not be true, and yet no evidence that it is, in the absence of the murexide reaction. One case with purely gouty history gave not the faintest indications of purple; another, for which no history could be secured, showed a faint reaction. A particular characteristic of this diathesis is the train of symptoms arising from a disordered function and secretion along the course of the alimentary canal and its appendages; in the stomach, acid dyspepsia and all its attendant symptoms.

Attacks of palpitation of the heart are frequent and annoying, at times, alarming. Evidences of hepatic disturbance in the disordered function of that organ, producing the hebetude, the gloomy mind, a feeling of listlessness, indolence. From time to time there is an increased discharge of urates in the urine. There may be neuralgias of various parts. One characteristic symptom of the lithæmic state is the pain in the tendo Achilles. These are the symptoms of the milder form, the so-called American gout, the lithæmic state.

In this affection there are no characteristic deposits. However, as there is evidence of uric-acid irritation in various fibrous structures, there is no reason why the pericementum should be exempt. Cases of phagedenic pericementitis are seen where there are no apparent deposits, perhaps no pus, and which give evidence of having the inception of the disease affecting some part of the pericementum on its lateral aspects; every symptom, every appearance indicating that we are dealing with a species of specific inflammatory degeneration; from that to coagulation-necrosis.

The pathology of the disease bears the most striking likeness to gouty affection. Every symptom corresponds to what we would conceive as arising from the action of an excess of uric acid circulating and affecting the parts.

Da Costa points out "that unless there be deposits of urates as tophi in superficial parts, small joints, the cartilage of the external ear, there is no more difficult discrimination than between chronic gout and chronic rheumatism." Garrod's experiment should determine the diagnosis. Dyce Duckworth, in the Proceedings of the Odontological Society of Great Britain, 1883, calls attention to the fact of dense teeth associated with the gouty diathesis, and their disposition to collect "irritating tartar." A patient of the writer, who has pronounced gout, tophi, disorders of fibrous tissue everywhere, apparently, has but three teeth affected by phagedenic pericementitis, although about the others there appears to be cirrhotic degeneration. They are being gradually extruded; this without deposits or pus. Some of his teeth were lost several years ago through this latter process, pyorrhea appearing only when the looseness of the organs was productive of decided inflammation.

Professor Roberts Bartholow states to the writer "that pericemental inflammation is common in hereditary gout." Duckworth mentions as one of the symptoms of obscure gout, hot, itching feet at night; Hutchinson, as another, hot, itching eyeballs. As Dr. Brubaker mentioned at a recent meeting of the Odontological Society of Pennsylvania, the result of therapeutic measures may form the important, the determining, or perhaps the only means of positive diagnosis in an obscure disorder. Thus, if a disease be suspected and its diagnosis be doubtful, the administration of medicinal agents known to be specific in that disease, if they remove the evidence of diseased condition, we are justified in making diagnosis of that particular disorder. For instance, an eruption, an inflammation, a tumor, of which we can get no connected history, resists all other treatment but a course of mercurials or iodids; yielding readily to these, syphilis is diagnosed at once. A tooth or teeth with no evidence of caries, past or present, becomes the subject of pericementitis; this without any history of mechanical injury; prove hereditary gout, or evidences of gout, in the individual, such as the presence of tophi, the presence of uric acid in the circulating fluids, and the pericementitis would be justly termed gouty.

Given the presence of such an inflammation, no family or personal history of gout, even an almost undetected increase in the amount of uric acid present, an anti-gout treatment, an anti-gout regimen, causes the disappearance of the pericementitis, and again we are warranted in ascribing a gouty origin to the case. The only evidence of gout may be confined to a single articulation, and there is no reason why the pericementum may not be the particular one involved. Certainly as the matter stands to-day we have excluded all other causes that lie within our knowledge as to the predisposing element of phagedenic pericementitis, and have no solution as to exciting cause, even approximating this in completeness. A diagnosis by exclusion is the only ultimate one (although advancing knowledge generally demands decided modification of theories). At present, every other possible explanation has been advanced and found insufficient, and until something better be offered, it must stand at least as a Scotch verdict. It is more a proper subject for investigation than for attack. The evidence is not all in, so one is wiser in reserving adverse opinion, unless he furnish more testimony to the contrary than has yet been offered.

Dr. Geo. B. Wood ("Practice of Medicine") calls attention to pain, inflammation about the teeth in gouty and rheumatic patients, this unaccompanied by caries. Jourdain has described a similar condition. Bourdet drew a picture which would seem to illustrate what we regard as phagedenic pericementitis, ascribing it to some constitutional disorder, however, not gout. Many authors have observed a form of pericementitis associated with the gouty diathesis; but, as might be expected, the descriptions are meager, unsatisfactory. We might as well depend upon the obstetrician for a diagnosis of retinal atrophy, as to look to the physician for an accurate delineation of dental troubles.

Whatever views any one may hold as to the concurrence of the local disorder with the constitutional condition, he cannot blind himself to the fact that we are being constantly confronted with cases of phagedenic pericementitis which give evidence of an involvement of the greater part or the whole of the membrane, this without sufficient local explanatory causes. Many of these cases have no perceptible deposits, and yet have a degenerative loss of the pericementum, and a form of caries of the cementum giving the appearance of excavations in places. That these deposits are not easily discoverable is, however, no proof of non-existence. Regarding the disorder (for purpose of premise) as gouty, if we recall Ebstein's views that necrosis precedes the deposit, again that certain arterial changes must precede the necrosis, the condition receives explanation. Again, the deposits may be extremely small, only isolated, crystals, and yet aside from the pathological state described by Ebstein, these crystals might act as decided irritants to a debilitated part. Certain it is, disregarding all other considerations, many cases, as the experiences of Drs. Peirce, Kirk, Thomas, Jack, and others will show, are relieved, if not cured, through an anti-gout regimen Many of the cases of these gentlemen have a clear, an undisputed, history of hereditary gout.

In at least ninety per cent. of cases the dental practitioner gives an unfavorable prognosis in this specific local disease, evidence that every conceived local remedy or measure has been tried and found to fall short of curative action.

In any disease a prognosis is favorable to the extent to which cause may be removed and effect remedied. In this instance, if we accept the gouty conditions as cause of phagedenic pericementitis, the prognosis, to be favorable, means removal of all sources of irritation or debility, general or local, a lessening of the strength of the predisposing, and entire removal of the irritating, cause or causes, all dead, all foreign, material to be taken away, and deposits and necrotic tissue, and a correction of the uric-acid state. The induction of tissue-reproduction for the replacement of lost substance. Statements as to curability vary. Many of the cures recorded are but too evidently not true phagedenic pericementitis, but a form of pyorrhea alveolaris arising from purely local causes, disappearing with their removal. Cases which have been apparently cured, and in which there is a return of the disease after an interval, are rationally to be regarded as those of gouty diathesis reappearing at a time coincident with the formation of an excess of uric acid.

In searching of treatment of this affection, the indications are, of course, the removal of all possible causes, general and local ; this will include the correction of any element tending to a weakening of the alveolar dental structures. Correct all faults of occlusion, remove all deposits, all necrotic tissue. Re-establish, as nearly as possible, the normal circulation in the parts ; all foreign, all dead materials are irritants. Increased mobility, arising from a loss of the retentive structure of the tooth, is the determining element of destruction ; this being a species of luxation, the pathological luxation of Dr. Allan. Rest, as nearly absolute as can be secured, is necessary to even hope of a cure. Deposits are removed by use of fine scalers. Proper solvents are as yet not at our disposal, although trichloracetic acid is very useful, not only by softening the deposits, but giving a clear view of the parts requiring operation. As possible general constitutional solvents, lithium citrate and carbonate would be used. These, it is known, affect urinary calculi, but it is very doubtful whether there would be *any* effect upon dental deposits, the object being to bring about an increased alkalinity of the fluids of the body. Tartrates perform this service more readily than carbonates or citrates. A tartrate of lithium, such as described to the writer by Dr. Kirk, is a preparation of that metal theoretically superior to either the carbonate or citrate for obtaining the desired action. Rest is obtained through use of splints ; these may be ligatures, wires, or plates. One method of securing immobility is to grind off the excess of tooth-substance of the affected organs ; this corrects the protrusion found with these teeth. A plate of metal is swaged to include the affected teeth and a sufficient number of those adjoining, to prevent all movement of the loose organs. This is to be tied, or better, cemented to place, until we have evidence of re-attachment of the pericementum, and a sufficient formation of bone to give normal fixation. It is frequently necessary to procure this immobility before scaling. Temporary ligatures suffice here. The coarse deposits are first removed and the pockets washed out with a solution of pyrozone, a weak solution at this time, five per cent. Trichloracetic acid next, softens much of the deposits, rendering removal easier, and gives a better view of diseased parts, by checking oozing. The use of aromatic sulfuric acid, full strength, or, better, ordinary H_2SO_4, diluted to one-tenth, will remove carious edges of process, if there be caries, or rather molecular necrosis. Subsequent treatment relates to the removal of any sources of irritation thereafter arising, and to governing vascular conditions. As a rule, stimulants being indicated, the writer has found a twenty per cent. solution of argenti nitras useful.

Cases are everywhere recorded in which, despite all local measures, the disease has resisted and persisted. It is for this reason, more than any other, why the condition has been regarded as being due to a constitutional predisposition.

An anti-gout regimen should be prescribed, and, if possible, enforced. The cases recorded by Drs. Kirk and Jack demonstrate how readily an amelioration or cessation of symptoms may supervene by following a proper diet course, at least a decrease in the amount of nitrogenous food consumed. Dr. Kirk's case, examined in detail, is a most suggestive one, a pericementitis recurring periodically, and which disappears with a lessening of the ingestion of nitrogenous food.

Patients may eat green vegetables, use a moderate amount of milk, any white meats, and all fish but salmon. Excess of carbohydrates is productive of gastric catarrh. Avoid sugar, as through its use uric acid is more readily formed. No spirituous and no malt liquors ; though if stimulants be demanded, a little whiskey or brandy, or a good claret. Wines having much body are bad, and worst of all is champagne. Wash out kidneys with alkaline mineral waters, Buffalo Lithia, Carlsbad, or Vichy. Use mild laxatives in morning, cream of tartar, Rochelle salts.

Cases in which there is decided evidence of the retention of waste products may require colchicum for their elimination. Bartholow "calls attention to its value in relieving the neuralgias of gouty patients, but another phase of relief through the removal of irritating substance. Some chronic cases may require the use of potassium iodid." From the same author this statement, "There is decided value derived from the administration of potassium permanganate in the uric-acid diathesis, favoring the conversion of uric acid into urea and preventing the formation of uric-acid calculi," also, "the value of manganese to relieve the disordered digestion of gouty subjects."

The sum of the matter is, there is a retention of irritating waste product ; the indication is its elimination.

Iron in anemic cases should be doubly useful ; the demand for oxygen-carrying bodies is more imperative than in ordinary anemia.

In this connection it is possible that many of the cases possessing a train of rather obscure symptoms suggestive of lithæmia, being relieved by inhalation of oxygen, belong to the same class.

Every one has seen cases of phagedenic pericementitis with an unquestionable gouty history, others a rheumatic, and others associated with renal or hepatic disorders ; but no one has advanced anything to show that these disorders were not evidences of uric-acid diathesis. Acid dyspepsia, chronic interstitial nephritis, and portal engorgement are all common symptoms of gout. The only form of rheumatism assigned as cause is the variety known as rheumatic gout, the phase commonly seen in females with a family history of gout, another form at the utmost of articulative change.

A mistake is made, when the word gouty is used, of assuming that this must be inflammatory gout with a classical history. It is possible to have the same range of action from the gouty poison as we would have from any general cause. An abscess of a sebaceous follicle, a mammary abscess, are both the productions of one specific cause, and how wide apart are the results.

Conditions make disease, and certainly the causes of gout are prevalent enough to have it common.

We have always referred to medical descriptions of disease for authority, but it is well known such descriptions do not always suffice.

It is not beyond the range of probability that we repay some debts to medicine by furnishing it with a new and positive symptom of a constitutional disorder. Phagedenic pericementitis may come to be regarded by the medical practitioner as a most important symptom of obscure gout.

It becomes more and more evident that we have no description of either phagedenic pericementitis or the gouty diathesis upon which all agree. The two following are offered as a suggestion : Phagedenic pericementitis is a degeneration of the retentive apparatus of teeth which arises without mechanical violence, specific *virus*, the selective action of drugs, general or local, and proceeds to its termination with or without the formation of calcic deposits or true pus, although pus and calcic deposits are the usual associates, the process terminating with the loss of the teeth.

"The uric-acid diathesis is a condition arising through faulty metabolism, causing the production and retention in the circulating fluids of an excess of uric acid, followed by the changes of tissue-degeneration, or those arising from the presence of a constant irritant in any member of the connective-tissue group."

This paper is to be understood as a presentation of evidence tending to a demonstration of the likeness between phagedenic pericementitis and a gouty affection,—an attempt to show that a more rational solution of the disease, its pathology, etc., is to be had through viewing it in the light of a consequence of the uric-acid diathesis.

Whether further search may strengthen or disprove such a theory is a question. The only purpose of the article is to state the question as it stands to-day. It is therefore open to discussion, refutal, or confirmation, as the case may be.

It appears to the writer the arguments advanced to favor the uric-acid hypothesis are strong, too strong, perhaps, to fault, until the exact nature of the faulty metabolism causing the diathesis receives full solution.

The present writing is without reference to that of Professor Peirce, which appeared in the *International Dental Journal.* A reading of his most excellent article was deferred until this had been completed. The allusions to the professor made here are due to his discussion of Dr. Allan's paper at the Odontological Society of Pennsylvania. Knowing of the existence of his article, an independent course of reasoning was adopted, to see how nearly the results would correspond.

DR. WEIL'S METHOD OF PREPARING TEETH FOR MICROSCOPIC STUDY.

BY WM. E. CHRISTENSEN, D.D.S., PHILADELPHIA, PA.

In the November and December numbers of the DENTAL COSMOS for 1893, Dr. C. Röse, of Freiburg i. B., has published a communication entitled "Contributions to the Histogeny and Histology of Bony and Dental Tissues," illustrated by drawings from a number of specimens of tooth and bone structures. Most of these specimens Dr. Röse reports to have been made "according to von Koch's petrifying method"; and the question occurs to me, how many of the readers—and especially how many of the American readers—of the articles know what is meant by "von Koch's petrifying method"? —a title which, I believe, all like myself see applied for the first time. The fact, however, seems to be that these specimens—perfect as they are in showing hard and soft tissues in intact connection—have been prepared according to a method for which the profession certainly is not indebted to Professor von Koch, but which was elaborated and introduced to the profession by Dr. L. A. Weil, in Munich, from whose "Habilitatiansschrift" (Munich, October, 1887) Dr. Röse himself obtained his information, and to the author of which credit has so far been given for the method by all leading authors and histological observers.

Dr. Röse's departure from this rule, however, dates farther back than to his paper in the COSMOS. In the *Anatomischer Anzeiger*, Nos. 16 and 17, 1892, and Nos. 8 and 9, 1893, as also in the *Deutsche Monatsschrift für Zahnheilkunde*, February, 1892, he tries to combat not only Weil's claim to the method, but also one of the most scientifically important discoveries upon which this method has thrown light—viz, the existence of a certain layer in the dental pulp which Weil describes as the "basal layer of the membrana eboris." The existence and nature of this layer has also been criticised by Professor Dr. V. v. Ebner, Vienna, 1890. As to the first point, Röse rests his assertion upon the fact that G. von Koch, Professor at the Polytechnicum in Darmstadt, as early as 1874 prepared specimens of mollusca by soaking them first in alcohol and then in alcoholic solution of resin, and hardening them by evaporation of the solvent. In this way the idea of hardening soft tissues so as to enable them to be ground was certainly started by von Koch, which Weil, in all his publications, has been more than anxious to maintain, and for which he has given von Koch credit; but as for our purpose of preparing the connected hard and soft tissues of the tooth, or of the tooth and its surrounding tissues, we certainly should obtain a negative result if we followed von Koch's method of preparing mollusca.

Little or nothing was known of v. Koch's procedure, and least of all among dentists, when Weil, in 1886, started his task of exploring the pulps of the fully developed tooth, and especially of obtaining transverse sections of all the structures of the normal tooth in intact connection. He at that time, by a postal card from Professor v. Koch, was told of v. Koch's procedure of preparing corallines, and was so given an indigitation of the way to follow; but it was only after more than fifteen months' study and experimentation that Weil was able to present to the profession, and to a scientific critic at the Royal University of Munich, the first exhaustive description of the dental pulp, with the first perfect illustrations accompanying it, which had ever been published, together with a description of this method of preparing the specimens, which was accepted by the committee of critics at the University of Munich, and the honor of *venia legendi* bestowed upon the author.

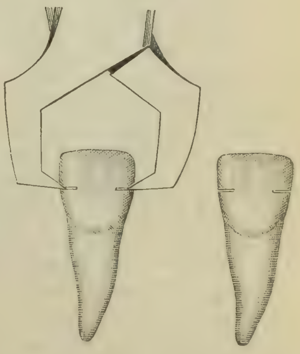
In view of this, it must seem almost absurd when Röse, after having adopted the method for his studies, and obtained results which could not have been reached by any other method, ignores or rebaptizes his source of information, and denominates knowledge of the literature as a *conditio sine qua non*.

Believing Dr. Weil's method to be but little known to a great number of American readers, I deem it not out of place here to give a condensed description of it. In describing only the procedure of preparing teeth for sections, it must, however, be remembered that the method is equally valuable and applicable in any case where sections of hard and soft tissues in connection are wanted.

Method.

When the tooth has been extracted, it must immediately be brought into some conserving fluid—as alcohol or watery solution of bichlorid of mercury—to prevent the pulp from shrinking. Also, in all further manipulations, as cutting, sawing or grinding the sections, careful attention must be given that the tooth or section is at no moment without an excess of moisture. If teeth of rabbits or dogs are used, it must be remembered that the tissues of the pulp stick more to the wall of the pulp-chamber than in human teeth. This is important at the first opening of the tooth. If human teeth are taken from dead bodies, it must not be more than six hours after death.

FIG. 1.



In order to enable the preparing drugs to enter the pulp, it is necessary to open the tooth and partially expose the pulp in such a manner that the pulp is not hurt. For this purpose we make a section with a sharp, fine saw on both sides of the tooth (Fig. 1), about midway of the crown, and cut off the part with a pair of strong excising or splitting forceps. The end of the pulp will then be exposed without being hurt. At the apex of the root a short piece is cut off in a similar way. For fixation of the tissues, the tooth is then placed in a saturated solution of bichlorid of mercury in water for about eight to twelve hours, after which it is washed in running water for about two hours.

To harden the tissues of the pulp, the tooth is then placed in alcohol of low degree, the strength of which must be gradually increased from thirty to fifty per cent., and from fifty to seventy per cent., leaving the tooth from eight to twelve hours in each of the three stages.

From the bichlorid of mercury there will be left a black precipitate on the specimens, which can now be removed by placing them for about twelve hours in ninety per cent. alcohol to which one and one-half to two per cent. tincture of iodin has been added. The iodin is removed by placing the specimens in pure alcohol until they recover their former white appearance.

After the process of hardening in alcohol, the teeth can be cut in two or three sections by means of a fine, sharp scroll-saw. The next step is to stain the specimens.

There are a great number of dyes used for staining preparations for microscopic studies. Dr. Weil, in the description of his method, mentions a great many, but he says he has obtained the best results with "aqueous borax-carmine," prepared in the following manner:

Eight grams of borax are powdered in a mortar together with two grams of carmine, and then mixed with one hundred and thirty grams of aq. dest. After twenty-four hours it must be well filtered, and is then ready for use.

The sections, when taken from the alcohol, are washed in running water for about fifteen minutes, and then transmitted to the dye for twelve to twenty hours, in which time they will become intensely colored. The excess of dye is removed by placing the sections in seventy per cent. alcohol, to which one gram of hydrochloric acid has been added to each one hundred c.cm. for as long as they have been in the dye. It is then well to place them in ninety per cent. alcohol for about twelve hours, and afterward in oil of cloves for one or two hours. This last procedure makes the specimens more transparent.

We have now come to the treatment with Canada balsam. This must in the mean time have been prepared in the following manner: A quantity of Canada balsam, as obtained from the druggist, is placed in an evaporating dish, and kept over boiling water until the balsam, by cooling, becomes solid and brittle like glass. This takes from twenty to thirty hours, according to the quality of the balsam.

When the sections are taken from the oil, they must be cleaned with pure xylol, and then quickly immersed in chloroform, to remain twenty-four hours. Then sufficient of the hardened Canada balsam is added to the chloroform to give a weak solution, and after another twenty-four hours the solution must be saturated with Canada balsam; the solution containing the specimens is then again put into an evaporating dish, and placed over hot water until the balsam once more becomes solid. As the chloroform boils at a low temperature (60–61° C.), the heat from the water must, to begin with, not be higher than about 60° C.; later it can be increased, but altogether slowness of the solidifying process is in favor of the results. Consequently, the procedure takes from twenty to thirty hours.

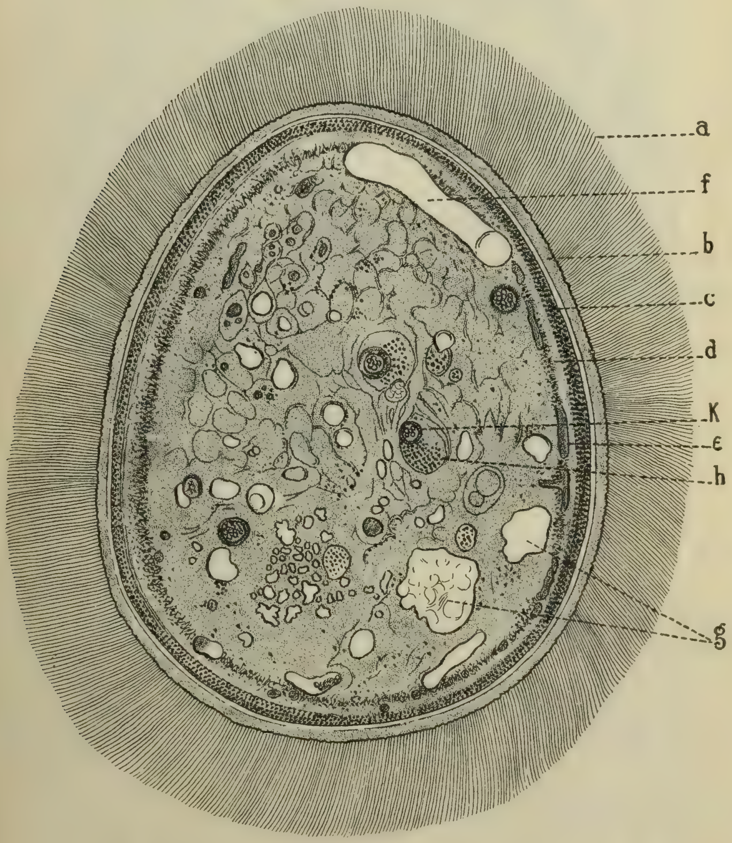
When the balsam, by cooling, becomes solid and brittle, the specimens can be cut out with a small, sharp chisel, and with a fine, sharp scroll-saw be cut into sections suitable for grinding. The grinding is done as when small sections of bone are ground for microscopic study, always under application of excess of water. The pressure must be very gentle, especially when the specimen gets thin; the result now depends somewhat upon the skillfulness of the operator. When the section is thin enough, which must be controlled under the microscope, it must be carefully cleaned in distilled water and finally mounted in Canada balsam.

This whole procedure may at first seem rather complicated, but the results certainly repay the labor. With permission of the author, the following illustrations are copied from his *Habilitationsschrift.*

For all the illustrations:

a, dentine; *b*, zone of calcification between the dentine and the membrana eboris; *c*, odontoblasts; *d*, basal layer of the membrana eboris; *e*, condensed tissues at the periphery of the pulp; *f*, veins; *g*, pulp-nodules; *h*, nerves; *k*, arteries.

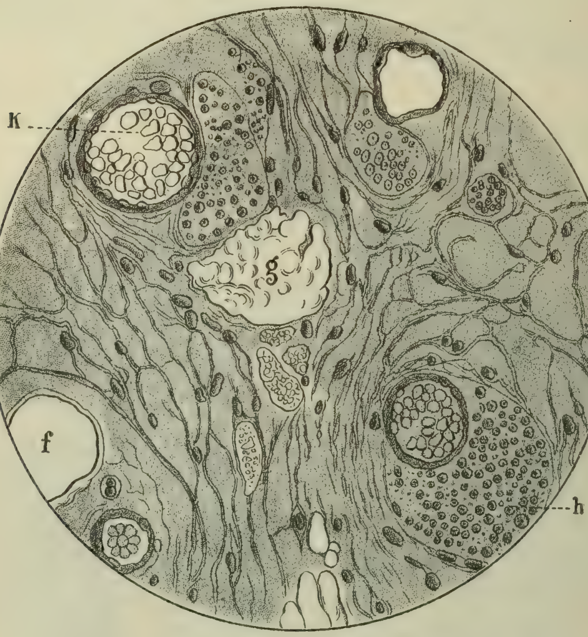
FIG. 2.



Transverse section from the upper portion of the root of a human molar. Magnified $\frac{45}{1}$.

Before Dr. Weil introduced his method, specimens of tooth-structures were prepared by decalcifying the tooth in acids, which could not possibly be done without injuring the extremely tender tissues of the pulp. Otherwise the pulp was only studied after having been extracted from the tooth, or by such remnants which would accidentally stick to the dentine in grinding it. In other words, a specimen really fit for studying the histology of the pulp was never seen before Dr. Weil made known his method, and his results with the same. It is a matter of course that Weil's method was adopted in most of the leading histological laboratories, and found praise and indorsement with such men as Charles Tomes, Charters White, Mummery, and others. Before then there was a sore lack in all manuals of dentistry of an accurate description and illustrations for study and knowledge of this for our special branch, most important organ. Weil, therefore, especially undertook to explore the pulp of the *fully developed* tooth, during which his attention was attracted by a non-cellular, fibrous layer between the odontoblasts and the cellular pulp-tissues. Weil measures this layer to be twenty to forty micra thick, and describes it as the basal layer of the membrana eboris. The existence of this layer, though supposed, had not before been asserted. Black mentions it in the "American System of Dentistry," (Philada., 1886), vol. i, page 829; also Bödecker in Heitzmann's "Mikroskopische Morphologie des Thierkörpers" (Vienna, 1883), describes the existence of a special layer between the layer of odontoblasts and the periphery of the pulp, and Ball (*Archiv für Mikroskopische Anatomie*, Band iv, 1868) describes the same layer; but each of these authors describes the layer to be of different appearance, and with contradicting views

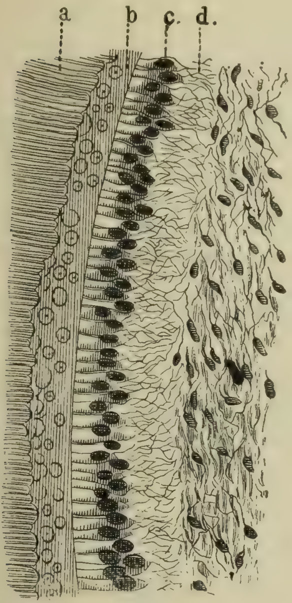
FIG. 3.



Part of the central pulp-tissue from Fig. 2. Magnified $\frac{300}{1}$.

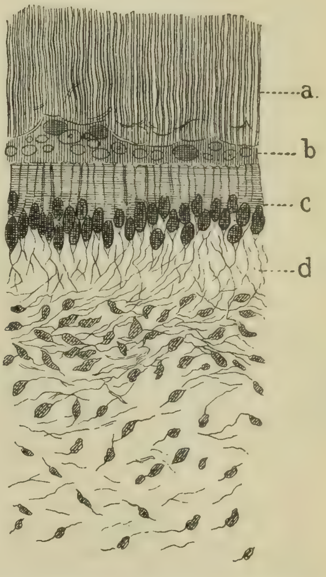
about it, this, however, being a natural consequence of the different modifications which had taken place in the respective specimens according to their different imperfect methods of preparing them. Upon the examination of several hundred specimens, most of them made after Weil's method, Mummery, Wellauer, Partsch, and other

FIG. 4.



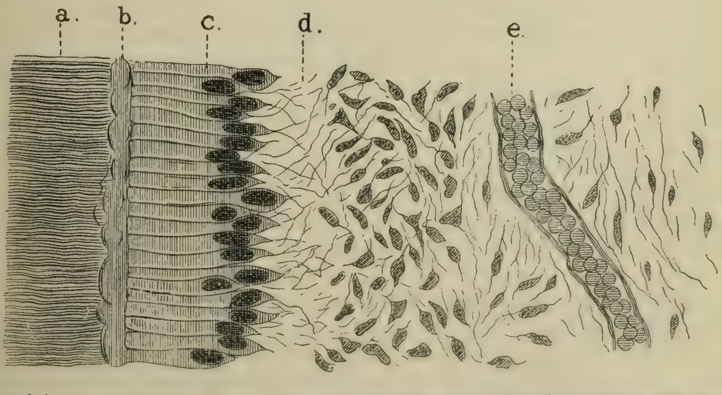
Part of a transverse section of the cervical portion of an upper central incisor, to show the zone of calcification and the basal layer of the membrana eboris. Magnified $\frac{350}{1}$.

FIG. 5.



From a transverse section of a human molar. Shows the same proportions as Fig. 4. Magnified $\frac{400}{1}$.

FIG. 6.



Part of the same section as Fig. 4; shows the configuration of the odontoblasts, and the proximate annexation of the cells to the zone of calcification. Magnified $\frac{500}{1}$. Homog. Immers.

well-known histologists agree with Weil in regard to the existence of this layer; only v. Ebner (Vienna, 1890) expressed some doubt in regard to its existence, and presumed that the process of preparation might have caused the cells to collect toward the center, and so left the zone next to the odontoblasts empty. This, it seems, furnished Dr. Röse an objective point, and not having found the layer by examination of a number of *not fully developed* teeth, prepared after Weil's method, he boldly asserted its non-existence. In seeking it in undeveloped teeth Dr. Röse is most probably wasting his time, as nobody has found it or asserted its existence except in fully developed teeth, and by Weil it is supposed to be formed only when the tooth is fully developed and the activity of the odontoblasts accordingly decreased. In trying to disprove this last point, Dr. Röse has not been very successful, his paper in the *Anatomischer Anzeiger*, Nos. 8 and 9, 1893, being rather a demonstration against his own assertion.

It is not for me to decide upon the question. My object has only been to call attention, as a matter of scientific interest, to the existence and nature of Weil's layer in the dental pulp, and also to the key to histological study of the dental organ, which, it seems to me, has been somewhat disguised in Dr. Röse's paper referred to, a procedure which is more surprising after the publication of Professor v. Koch's letter in the *Anatomischer Anzeiger*, Nos. 25 and 26, Jena, 1892.

AMALGAM.

BY DR. C. EDMUND KELLS, JR., NEW ORLEANS, LA.

THE practice of dentistry involves so many arts and sciences, is composed of so many processes that are pleasing and alluring, it is perhaps not very remarkable that such a one as the manipulation of amalgam has not received more attention than has been bestowed upon it.

It would appear that in its early career, for reasons which are readily discernible, it established for itself a deservedly unenviable reputation, which even at this enlightened day has not been entirely eradicated, notwithstanding that it has proven its great intrinsic value, and probably saved more teeth than any other one material. Therefore, recognizing as I do its value, and appreciating the apparent neglect it has received at the hands of the profession, I have been led to record my views upon the subject.

With kindness for all and malice toward none, let us look at the facts as they daily present themselves. For an ordinary patient who calls for the first time we may find, say, a dozen fillings which have been inserted by some man of established reputation. A certain number of these are of gold, and a pleasure to look upon, while others are of amalgam, and do not appear to have been accomplished by the same hands. In all these years of my practice I have frequently seen and admired gold fillings, crowns, and artificial dentures to such an extent as to inquire the name of the gifted operator, and yet during all this time I have never once (or my memory greatly deceives me) been inspired to do the same upon the sight of an amalgam filling.

The latest catalogue of one of the largest dental supply houses of the world has listed six hundred and twenty-one different instruments for the packing of gold, and forty-seven for the packing of amalgam. Just think of it! Some fourteen times as many different patterns of instruments may be obtained for the manipulation of the one material as for the other.

There is no doubt in my mind that a great majority of the profession believe that the relative amount of skill required for the proper manipulation of the two materials might be well represented by that self-same ratio of six hundred and twenty-one to forty-seven, and that will probably account for the previous rather remarkable statement as to the result of my personal observations; but with this I most emphatically differ. That amalgam may be mixed to the consistency of putty and inserted into any cavity with little or no difficulty, is doubtless true, and no one will deny; but, mixed as it should be, dry and hard, to me its satisfactory insertion into a cavity, properly prepared, is a very much more difficult operation in many instances than would be the insertion of gold where that material was indicated.

It is not within the province of this paper to deal with this subject from any other than an entirely practical point of view. The method of the manufacture of alloys to be used for filling, and the very many different metals that might and do enter into their composition, could well form an ample theme in themselves, and for the time being must have no interest for us. My purpose is simply to detail—

1. My general opinion of the material, based upon fifteen years of its use and careful observation of the results obtained.
2. Where I consider the material to be indicated in my own practice.
3. The method employed in its manipulation.

While there is much to be said in favor of amalgam as a filling-material, it also presents some readily-to-be-perceived disadvantages, which at once stamp it as a material to be used not universally, but with discretion. Therefore, careful consideration should be given to both its advantages and disadvantages, the latter of which will be first taken up.

One of the objections, and without doubt the most serious one, to the use of amalgam is that perfectly uniform results are not obtained, even in the same mouth. This may be attributed to (*a*) the fact that different lots of the same brand of alloy may, and do, vary in their composition; (*b*) the fact that it is practically impossible to manipulate it in a uniform manner, and under the same conditions; (*c*) the process of crystallization may produce varying resultant masses, as it, itself, has undergone under varying conditions.

Owing to the method employed in their manufacture, the low fusing-point of their component metals, and the "personal equation" of the melter himself, which assuredly is an important factor, perfectly uniform results, year in and year out, are not obtainable.

Most manufacturers will probably not uphold this statement, although in my own experience I have had one house practically repudiate the products of its own hands. Thomas Fletcher, of England, than whom probably no one has spent more time upon the subject of these alloys, frankly admits this point, and even states that the opposite edges of a shilling may give different results upon assaying, while they are coined with the greatest precautions possible. He now states that after many years of experience in the matter and backed up by every possible means for working with precision, it is impossible for him to produce uniform alloys, and I think we can in all fairness take it for granted that what is impossible for him to accomplish in that line cannot be done by others. So I think we may safely conclude that one of the causes of the varied results obtained with amalgam fillings is due to the alloy itself.

The fact that it is impossible to manipulate amalgam in a uniform manner and under the same circumstances must be patent to all, and consequently perfectly uniform results cannot be expected.

The filings appear at times to amalgamate much more freely than at others, and so a uniformly plastic mass cannot always be produced. In certain cases it can be used so hard as to powder under the packing instrument, while in other cases it must necessarily be more plastic in order to be manipulated as desired.

So, therefore, all these conditions may affect the amalgam fillings.

The process of crystallization, to which is due the hardening of the plastic material, is one of nature's subtle phenomena which, while it must create admiration, is surely incomprehensible.

If a mixture of certain definite proportions of an alloy and mercury be made, and the same be allowed to crystallize under the varying conditions that present in the mouth, it would be perfectly rational, I think, to believe that slightly different results might be produced, as these conditions more or less affected this process.

Therefore, notwithstanding the greatest care in its use, here again probably is a factor that may at times tend to produce the variable results.

Another very serious objection to amalgam lies in its liability to discolor under certain conditions, and these, whatever they may be, are so frequently met with that it quite bars its use almost always in positions in the teeth where it may be conspicuous to others.

However, this discoloration does not always occur, by any means, and many are the cases in which fillings keep almost their original brightness and luster for years, standing in that respect equally as well as gold.

Having enumerated the disadvantages of amalgam as a filling-material, let us now turn to its advantages. These may be quickly summed up in a single sentence which reads, "Amalgam will save many teeth for a longer period of usefulness than will any other material."

Only a few years of fruitful practice will be required to quite dishearten the most enthusiastic admirer of gold as a filling-material, and convince him that not only in his own hands, but in those of other and eminent men whose work comes under his observation, the use of that material in certain well-defined cases will certainly terminate disastrously, while a better result will be obtained with amalgam. I do not mean to say that I consider gold incompatible with tooth-structure. Not at all, but I am convinced that the method of manipulation required by gold is incompatible with a certain character of tooth-substance.

However opinions may differ as to the cause, there can be but one opinion upon the results obtained, and that is, that in the class of cases here referred to gold will not save the teeth, while amalgam will, and that is the point at issue after all. When, therefore, after due observation, it has been decided that amalgam will save a certain class of teeth better than will any other material, the questions of where to use it, and the best method for its manipulation, if there is such a thing as a "best method," become at once of paramount importance.

Where the use of amalgam, as indicated in my own practice, may be limited only by the number of teeth requiring filling, as at one time or another, I have inserted it satisfactorily in each of the thirty-two teeth. In the anterior teeth, while at times it might otherwise be desirable, it should only be used when it will not be disclosed to view in conversation.

The method employed in its manipulation will be considered under the following heads:

General shape and style of instruments used.

Preparation of the cavity.

Method of preparing the amalgam.

Method of inserting the amalgam.

Of the forty-seven "amalgam pluggers" already mentioned as being found in the stock of the supply houses, I find six, and only six, not only that I could use under the greatest press of circumstances, but even conceive of being at all adapted to the proper packing of the material for which they were designed.

I cannot imagine how it could possibly happen that amalgam could be properly packed into a cavity by an instrument having a large, flat, serrated surface. To my mind, I can only conceive of such a material being forced into the position required by perfectly smooth-surfaced instruments.

Such being the opinion held, my set of instruments has been selected or devised and arranged not only with the view of being able to reach and properly pack the material into each and every cavity that may possibly present, but to fill them as expeditiously as possible.

It has been suggested to me that there was an unnecessarily small gradation in their sizes, and consequently a needlessly large number of them, which must result in confusion in their use. But, as a matter of fact, quite the contrary obtains, as in the system used for the preparation and filling of a cavity one instrument naturally follows upon the use of another definite one, and, instead of confusion, great expedition results.

In the proper preparation of the cavity frequently lies one of the most difficult steps in the use of amalgam.

Very often this presents many more difficulties than if gold were to be used, for in many cases in the use of gold no undercuts at all are necessary, and a cavity with absolutely parallel walls may be safely and satisfactorily filled (with soft foil), while at other times a slight enlargement within the cavity upon only two opposite sides is all that is requisite, and these conditions are usually readily obtained.

Not so, however, with amalgam. For this material the ideal cavity is one in which, by its general shape, it is a little larger inside than at its orifice, while at its very margins the walls are at right angles to the surface of the filling, under which conditions the greatest edge-strength is obtained in the filling-material, and also in the enamel-margin.

This is a condition usually very easily obtained in all simple cavities, but often very difficult to create in compound cavities. Sometimes, in fact, it appears quite impossible to satisfactorily shape some of these compound cavities, when, of course, it only remains to do the best possible under the circumstances.

The preparation of the cavity requires necessarily as great care as if gold were to be used. The marginal surfaces of the tooth to be filled are first polished with disks or strips if it be an approximal surface involved, or with fine-cut burs or stones if it be other, that the extent of the cavity may be at once determined.

Thereupon the shaping of the cavity is proceeded with, during which operation it is kept free from chips, care being taken that a slight (not deep) "undercut" is obtained upon all sides. The margins are then "squared" with a fine-cut bur, which leaves them highly polished. Then the bottom and sides of the cavity should be gone carefully over with an excavator, as this will sometimes reveal a soft spot that the engine-bur passed undetected by. Lastly, the cavity is wiped out with a pellet of spunk saturated with creasote (Morson's only), which will detect, by a change of color, any decay that may remain, and which is then removed. If a cavity is prepared entirely with excavators, its simple syringing will clear it of all chips. Not so, usually, with one prepared with the rapidly revolving engine-bur. This removes the tooth-substance in the shape of a very fine powder, which in some places will appear to be ground into the wall or floor of the cavity, and simple syringing will not remove it. Therefore it is always necessary to forcibly (comparatively) swab out the cavity with one or more pellets of moistened spunk, which will leave the cavity perfectly clean. The cavity is once more wiped out with creasote, and when dried with hot air presents a glistening surface everywhere. This applies to cavities of a limited depth only.

I can but believe that the less metal there is inserted in a tooth the better will be the result obtained, and so it is my invariable custom to line all deep cavities with cement, upon which the gold or amalgam is placed as a veneer. Of course there frequently presents a cavity where it is not prudent to remove all of the softened dentine from its floor, and against that substance the use of a metal is out of the question. To that class I do not alone refer, but to them and all deep-seated cavities this method applies. Deep-seated cavities are more liable to be sensitive also, and this cement lining being a somewhat poorer conductor of heat than amalgam, lessens the liability of the patient to inconvenience from thermal changes after the completion of the work.

Where this sensitiveness is but slight I partly fill with cement, and finish with amalgam at the same sitting; but where it is great I fill entirely with cement, and allow it to stand for three or four months, when it is partly cut out and amalgam inserted. In these cases the *floor* of the cavity is usually covered with a thin cream composed of the oxid mixed with creasote, which prevents the pain attending the touching of that part of the cavity with the oxychlorid. Perhaps it might be well to add that after this "cream" is applied as desired, it is dried carefully with spunk, care being taken that none be left upon the *walls* of the cavity. By these methods rarely does a patient complain of discomfort from the application of heat or cold ; and as for loss of a healthy pulp from the irritation produced by thermal changes, that result is beyond the range of possibility.

In pulpless teeth, not only are the root-canals filled with cement, but with it is also filled the entire pulp-chamber and body of the tooth, allowing an even depth all over the floor of the cavity for the amalgam veneer. In all compound cavities this system of veneering increases immensely the difficulty of filling, but, to use a common expression, I find "it pays." The rule followed is to practically replace about all the dentine with cement, following its original outlines, and to enamel it with metal.

Sometimes a rather shallow cavity presents, which is somewhat sensitive to heat and cold. When the floor is found good and hard, a very thin layer of Hill's stopping—a very fair non-conductor—is placed over it, with good results.

I have laid especial stress upon not having the undercuts deep, because it seems to me that I have observed some change takes place in largely overhanging enamel walls, by which they lose their strength and integrity, and are liable to break away.

It is not possible for a busy practitioner to follow out all the lines of thought that present themselves, or to investigate all the causes that produce certain results that are to be seen from day to day. Many times, therefore, however much we might like to look deeper into a subject, we are compelled by press of other and more important matters to stop theorizing, and accept the result obtained from our own practical experience. Therefore I merely make the assertion, founded upon personal observation only, and not substantiated by chemical investigation, that I fully believe that oxychlorid of zinc produces a beneficial effect upon tooth-structure, not to be observed as following upon the use of oxyphosphate.

This being the case, it hardly becomes necessary to state that the oxychlorid is the one material always used for this lining process.

Thus the preparation of the cavity under various conditions having been described, naturally we come to our next classification, the preparation of the amalgam.

The required quantity of the filings is poured into the palm of the left hand, and sufficient mercury added to allow of its being rubbed with the finger into a dark pasty mass. This is at once washed with alcohol, whereupon the oxid is removed, and the amalgamation becomes more perfect. As soon as the button becomes perfectly clean, it is placed upon a clean piece of white paper and triturated with a steel blade until a fine, even grain is obtained. It is then twisted in a piece of china silk, which leaves no fibers adhering to it (which was the objection I found to chamois, and led me to seek something better), and well compressed with a pair of heavy pliers. The resultant wafer is perfectly clean and bright, and as free from all contaminating substances as is one's gold, which usually is handled with such great care. It is then broken into small pellets, suited more or less to the size of the cavity, but never very large. For cavities whose shape will permit, the amalgam is squeezed out dry and hard as possible, but for contouring usually it is found necessary to divide the button and allow a small portion to remain a little more plastic for use in restoring the surface.

We now reach the method of inserting the prepared amalgam.

The cavity having been prepared as previously described, must be positively guarded against moisture by means of the dam or other agencies, and thoroughly dried with hot air. The process of filling it then becomes more or less easy according to its location. If in a lower tooth, a pellet is placed in it, and the force of gravitation comes greatly to our aid, and holds it there. If the cavity be a large one, the pellet of amalgam is flattened against the walls and floor with the flat blade, whereupon the instrument is reversed, and the burnisher of the proper size is at hand for the process of apparently rubbing it into the very substance of the tooth. When this is accomplished, another pellet is added and the process is repeated, and so on until the operation is completed. Warming the burnisher is often found advantageous in packing the surface of the filling.

Now this is all very well in the lower teeth, but when it comes to putting pellets of hard and dry amalgam into an upper one, well, that's slightly different. In such cases, I place a piece of cut spunk, say about one-half inch square, below the cavity, and hold it in place with the mirror. The pellet of amalgam is then placed upon it directly at the orifice of the cavity, from which position it is easily (that is, perhaps it is easily) forced into place with the flat blade, and the burnishing process proceeded with.

So, also, in approximal cavities, spunk can be of the greatest assistance in getting the material into the cavity.

The preparation of a cavity, as well as its filling, should be so perfectly systematized as to become, under ordinary circumstances, mere routine work.

A given cavity is usually prepared with the same instruments, and one prepared with burs of certain gauge is filled with certain definite-sized instruments that are made to correspond. For example, a large cavity is more quickly and better prepared with the larger sizes of burs, which indicates that the larger packing instruments should follow, for it would not only be waste of time, but actually as good results could not be obtained by the use of the smaller sizes of burnishers. Again, a little cavity prepared entirely with a No. ½ bur can be most expeditiously and satisfactorily filled with the little ball burnisher, made especially to follow that individual instrument. And so on through the entire line. Thus, while at a first glance there may appear to be an unnecessary number in this set of instruments, when the system upon which their use is based is considered, such is found not to be the case.

When a cavity is filled as has been described, there results a fairly hard filling, the edges of which may be brought nearly flush with the cavity margins by the aid of the proper instrument, silk, and dampened spunk. For this purpose the spunk is preferably cut, not torn, into little squares, and when dampened, as mentioned, forms an excellent medium for procuring a nice surface upon the filling.

Upon approximal surfaces, orange-wood, properly shaped and moistened, will be found most excellent for trimming the filling into shape, and removing any surplus from the cervical margins.

Particular care must be taken that in articulation the antagonizing tooth does not strike the filling, or the work will stand in danger of being ruined.

An amalgam filling should under no circumstances be left unpolished, but always at a sitting subsequent to its insertion it must be carefully polished and burnished, and, where necessary, ample room to work upon approximal surfaces must be procured by wedging.

In compound approximal cavities, when the dam has been applied, it is much the safer practice to first cut the ligature and draw it carefully away, keeping it at the gum-line and away from the filling. Then the septum of the dam should be cut, that it may be removed without having to be drawn between the fillings.

A little carelessness here, in pulling off the dam and ligatures, may result in taking away a portion of the newly made filling.

It has been stated that cavities prepared for an amalgam filling must be kept perfectly dry during its insertion. This is true only where it is possible. Very occasionally a lower molar presents, which to keep dry during the entire filling is out of the question. In such cases I work as expeditiously as possible, and get the entire cavity-walls lined with the first pieces of amalgam before the "crevasse" occurs, and the remainder is packed wet. However, under these circumstances a perfectly satisfactory result is not obtained.

The matrix does not enter as a factor into amalgam work with me.

Very frequently large compound approximal cavities are found in molars and bicuspids, extending above the margin of the gum. In these cases gold may not be indicated, and yet amalgam proves unsightly, as its labial portion may be visible. Here, then, is an opportunity to use a combination gold-and-amalgam filling, which I proceed to insert as follows: The cavity having been prepared and lined as heretofore described, Hill's stopping is inserted, and properly contoured in that portion only of the cavity where it is desired the gold will be placed. The rest of the cavity is then filled with amalgam, and very carefully finished off beneath the gum,—the vital point. At another sitting the Hill's stopping is removed and replaced by gold. Where the dam may be applied these teeth may be so treated with comparative ease, but very frequently the cavity extends so far beneath the gum that the application of the dam is impracticable. Here, then, the greatest care must be taken to keep it dry. An approximal cavity whose margins extend near to or above the gum-line must always be protected at that point from moisture. However dry the surrounding parts in general may be kept, there will be slight exudation from the gum, which must be taken care of. When possible, the dam should be relied upon; at other times, an orange-wood wedge may be used. Again, the gum is touched with carbolic acid, and a piece of spunk, cut to proper size, may be packed against it and found to answer the purpose; but something must be there to protect that margin.

A very troublesome (to me) class of cavities is that found upon the labial wall of the anterior teeth, and extending beyond the gum and upon the very root of the tooth. Here, at times where I cannot manage gold, I fill that portion of the cavity under the gum with amalgam, whereupon to insert gold at a future sitting in the remaining visible portion becomes clear sailing.

I have met with very frail laterals, centrals, and even cuspids in which I have found it advisable to fill the entire lingual aspect of the cavities with amalgam, while the labial portions were filled with gold, and their color and translucency perfectly preserved.

I have already made one statement in regard to oxychlorid, and I will now likewise make another, which is, that I believe that a combination of gold and amalgam, inserted separately as described, will save a certain class of teeth for a longer period than will either gold or amalgam inserted alone. This is a point that I know has been discussed pro and con, with no definite conclusions being reached, but I am basing my assertion upon actual results that have stood the test of time. It is now my usual practice to fill such teeth always in just that manner.

Many have been the discussions over the electro-chemical theory of decay, and very plausible arguments have been brought forward by the advocates of both views upon the subject.

I remember once opening a newly received journal, and reading a very interesting article, by which any one open to conviction would have surely been convinced that amalgam and gold in the same mouth meant nothing less than a "slaughter of the innocents" by the powerful electric current thereby generated. A few pages farther on, another writer advanced equally as convincing arguments, by which it was proven that practically the only way to save teeth was to fill them with various metals, whereby beneficial electric currents would be generated, and their preservation indefinitely assured.

All this is very interesting, no doubt; but where, in actual practice, we see tooth after tooth fail in the vain endeavor of a fine operator to save them with gold alone, and on the other hand very satisfactory results obtained by the judicious use of both materials in our own practice, what does it matter whether a galvanometer can be wired up to some of these fillings and a current shown or not?

For the repair of large gold fillings which begin to show signs of failure at the cervical margin and inaccessible places, amalgam is always used, and with the best results.

The mixture of alloy filings with cement, as advocated by some, has been tested, but not found altogether satisfactory.

The method that has also been suggested, of first partly filling a large cavity with oxyphosphate, into which, while still soft, a pellet of amalgam is forced to serve as an anchorage for the rest of the material, hardly meets with my approval, although cases might present where such a procedure would be advisable.

Methods have also been advanced, and I believe are practiced by some, by which a filling can be finished at one sitting, but to my mind the only manner in which to obtain the best result is to defer the polishing until a future sitting.

So also has it been demonstrated that a combination gold-and-amalgam filling may be inserted at one sitting. However, I fear that the advocates of such methods lose sight entirely of the object of such a combination filling, which appears to me should certainly occupy two sittings, as described.

Having observed the very beneficial results obtained from the use of nitrate of silver upon denuded cervical surfaces, I was led to adopt it in conjunction with amalgam fillings, and I believe with good results.

When one of these desperate cases presents, in which the cavity extends upon the root of the tooth, and appears to be almost without limit, it is carefully wiped out with nitrate of silver, and then dried just previous to the insertion of the amalgam.

While it is impossible to say positively whether or not such treatment produced any beneficial results, I am very much inclined to think it did, and consequently I have comparatively recently adopted this method in ordinary cavities in which the walls were exceedingly soft. However, that has not been practiced a sufficient length of time from which to form an opinion as to its value.

There are upon the market, it would be quite difficult, if not impossible, to say how many kinds of amalgam alloys, each of which must have its admirers and users. To say which of these is the best —if any one is the best—would be an impossibility, and so my advice would be that when one is found that "works" satisfactorily, and produces the best results, to settle down to its exclusive use.

So, while I am not prepared to advocate the use of any one alloy, I am ready to boldly declare against one, which, however, is not an alloy at all, for it is claimed to be pure copper. Now, whatever you may use, do not use copper amalgam, save occasionally in deciduous teeth, would be my advice. Fortunately for me, and, incidentally, for my patients as well, I began the careful experimental use of this material some time before its "craze" swept over the land, and early began to see its bad results; otherwise I might have more cause to regret its advent among us.

Let me add my most earnest solicitations in regard to keeping of a full record of all operations. A stenographic record of the tooth, and what treatment was given it, including, in the case of a filling, the surface involved and the material used, can be made in a few seconds of time. In the case of the use of plastics of any kind, a distinguishing mark of some kind should be added for future reference.

With a record faithfully kept, not only will a practice be carried on in a business-like manner, which in itself is very desirable and commendable, but then, and then only, will it be possible to form an intelligent opinion of the various materials used.

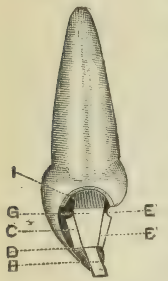
RESTORATION FILLINGS IN INCISORS.

BY I. C. ST. JOHN, D.D.S., MINNEAPOLIS, MINN.

In filling the cavity described in the March DENTAL COSMOS, page 199, it is necessary to commence the operation by anchoring separate portions of gold at the base of the cavity and in the auxiliary dovetail, and to continue the two parts separately until they can be safely united. The sooner this union is accomplished the more simple will be the operation, and more perfect and strong will be the inner surface of the completed filling, providing the proper materials and methods have been used. The union is readily accomplished by means of two or more narrow strips of annealed No. 60 iridium gold; one piece (Fig. 6, *g*) being attached at one end to the gold in the main part of the cavity at *i*, while the other piece, *h*, is likewise fastened to the gold in the auxiliary dovetail.

The intervening surfaces are then carefully touched with a little oxyphosphate cement, mixed very thin, and all excess is immediately wiped off with a ball of cotton. The cement should be mixed so thin that the liquid is simply colored by the powder, and not appreciably thickened by it.

Fig. 1.



The free portion of the first piece of gold, *g*, is then brought down over the cement-moistened surfaces and burnished firmly against them, being carried over the ridge, *d*, and into the labial groove, *c*. The burnishing is accomplished by placing a strip of cottonoid, or some other suitable substance over the gold to prevent the burnisher from coming into direct contact with it, which would destroy the cohesiveness of the gold surface.

The second piece of gold, *h*, is then lapped up over the first piece, *g*, and burnished into it in the same manner as the latter was to the cement-moistened surfaces of the cavity. The same protection is also given to the gold surface from the burnisher. Every portion of the intervening surfaces should be treated in this manner until a continuous surface, of a thickness of at least No. 120 gold, has been secured; care, however, should be taken not to cover the enamel-margins, as even an infinitesimal quantity of cement is undesirable at that point.

The illustrations in the March Cosmos fully show all the surfaces of the cavity which are to be so covered, including the spur or point, *d–f*, which is to dovetail into the filling. To the gold-covered surfaces the remainder of the filling is firmly united without fear of its warping or drawing away from the walls from malleting the additional gold upon it. If no other portion of the cavity is so treated, the shallow labial groove, *c*, and intervening ridge of enamel, *d*, should invariably be so covered.

For those who do not believe in placing gold in cement, I will suggest the following experiment:

With a large rose bur, cut a concave cavity in a tooth-brush handle, to a depth not exceeding one-half the diameter of the bur. Into this cavity, which is without any undercut or retaining form, try to mallet a gold filling. When satisfied that it cannot be done, moisten the cavity with cement, as described above, and quickly try it again. If desired, amalgam can be used in place of the gold, and the result will be convincing in either case.

No good operator would rely on an adhesive medium alone to retain any metal filling in the mouth, neither should any one ignore any means by which the desired end can be more readily and perfectly attained, especially when his patient will be the gainer. If any cement has carelessly been smeared over the enamel-margin, or has been forced out at the edges of the layer of gold which has been burnished into it, it should be removed with a clean, sharp, and smooth-edged instrument before building over with gold.

No well-equipped office should be without the above-mentioned iridium rolled gold; I know of no other preparation which will fully take its place. In annealing it, I always bring it to a red heat, as it is thus rendered perfectly clean and very cohesive. The characteristic qualities of this preparation are presumably known by all operators. It is difficult, if not impossible, to consolidate and perfectly adapt gold cylinders alone to a shallow groove of any length. I also moisten with cement, in a similar manner, that portion of any cavity which is to receive the first cylinder of gold, and thus avoid cutting extra pits or grooves in sensitive dentine for the purpose alone of starting the filling. The first piece of gold should be annealed. It should be remembered that the same rule holds good here as in mending broken china,—viz, that an excess of cement does not give a more perfect joint.

When cement is used as advised, the gold will remain where it is placed, as though held by a magnetic force.

I do not advise this particular use of cement as a substitute for good and positive retaining form, which should always be on the best mechanical lines.

(To be continued.)

PROCEEDINGS OF DENTAL SOCIETIES.

JOINT MEETING OF THE FIRST AND SECOND DISTRICT DENTAL SOCIETIES OF THE STATE OF NEW YORK.

A JOINT meeting of the First and Second District Dental Societies of the State of New York was held on Monday evening, February 12, 1894, at the Wilson Building, No. 153 Pierrepont street, in the city of Brooklyn ; Drs. O. E. Hill and William Carr presiding.

INCIDENTS OF OFFICE PRACTICE.

Dr. D. W. Barker. I have brought with me some of the material which I am in the habit of using for finishing off the approximal surfaces of amalgam fillings when they are first inserted. It is very thin copper ; in fact, it is so very thin that to give it additional strength I double it. I have prepared a quantity of the strips as I use them, and those who wish may take one or two, to try them After slight use, these strips become covered with little deposits of amalgam and mercury, and are soon useless ; but they give a very beautiful finish to the approximal surface of amalgam fillings. This material is sold under the name of copper tinsel. It has upon it a sort of gelatin mixture, with coloring matter in it which can be readily removed with boiling water, and a bright surface is left. It can be obtained at almost any hardware store. I got mine at 85 Chambers street, New York. It costs only five cents for a large sheet.

Dr B. C. Nash. I would suggest a method in this connection, which was shown to me by Dr. Freeman, of New York, of taking a piece of thin rubber-dam, cutting a strip of any width desired, and stretching it in between the teeth, for smoothing approximal fillings. It answers this purpose admirably.

Dr. F. T Van Woert. I have here two or three little instruments that have been handed to me, devised for the purpose of removing broken drills. They are simple coils of wire, on the end of which is a tube of thin copper, and filled with a cement of shellac and wax, that by slightly warming and passing into the root catches the end of the drill and takes it out very nicely. I am one of those fortunate ones who never break drills, so I have no use for them at present, but I will keep a few on hand in case I should need them.

Dr. V. H. Jackson. With regard to the removal of broken points of drills, I devised a plan about three years ago that is very similar to what Dr. Van Woert has presented. I here present the original drill that was broken, and the instrument used in removing it. It will be observed that the shank of a drill mandrel is the same size as the point which is broken off. After removing as much of the dentine as can be from around the end of the broken point, take a piece of tagger's tin or German silver, very thin, bending it in the form of a cylinder the size of the broken shank. Then solder it to the end of the shank with a soldering-iron, having no excess of solder. That leaves a socket, in which is placed a very little powdered shellac. This is warmed slightly, and pressed up over the broken end. There is no coil of wire. I should think the wire would be rather in the way than otherwise. After a few rotary movements, the point can generally be removed. I will send around the original instrument, so that the gentlemen may see it. This was used between three and four years ago.

I was requested to present some models here, and I have chosen a case representing a condition of affairs that is difficult, with ordinary methods, to correct, and still have an appliance that is agreeable to the patient. It is rather uncommon for the teeth of the lower arch to articulate outside of those in the upper, without the central incisors closing outside also. The lower lateral incisors and bicuspids, in this case are outside of the arch. It will not be necessary for me to say much, in description of the case, for I will pass around the models, and you can seen how easily the work was accomplished. The patient wore the same appliance as a retainer for about sixteen weeks. The appliance was made by anchoring a base-wire on the inside of the arch, with "crib" attachments to the first molars on each side, which was formed into the curve we desired the arch to assume when corrected. A small spring-wire was then arranged to extend from the base-wire over the arch to the labial side of the teeth to be moved. That necessarily made a spring of it; then the wire is bent at right angles, to extend along next the gum to include the teeth to be drawn in, and passing over the arch again to the base-wire, to which it is soldered. By the closing of the loop portions that extend over the arch, which is in effect a spring, it draws the bar more closely to the base-line, and thus we get the necessary pressure on the teeth.

Dr. A. H. Brockway. A little incident occurred the other day that serves to illustrate the necessity of educating the general public as to the scope and object of our calling. There came into my hands, some two or three years ago, a young lady, about eighteen years of age,—a remarkably pretty girl, but with exceptionally soft and fragile teeth. She had had a rather unfortunate experience at the hands of two or three other dentists before she came to me, and I found her mouth in a very unwholesome and unsatisfactory condition. I put it in what I considered good order, and discharged her with the injunction to return in about a year. Last fall she came back to me, and to my great gratification I found her mouth in an extremely satisfactory condition. I found very little to do; I think all that was necessary was to restore two plastic fillings that had been placed in her upper central incisors some three or four years before she came to me. The teeth were of such a fragile nature, and so badly decayed, that the dentist had evidently despaired of saving them with anything except oxyphosphate, and he had very properly used that. I simply had to add a little to what had worn away, and discharged her very much pleased. A few days after, my assistant announced her father, who is a well-known physician. He said he had called to pay his bill. As I never allow any one to wait very long under such circumstances, I stepped into the front room to receive the money. As I entered, I saw him standing there. I did not see his face, but, as Artemus Ward said, "I knew from the expression of his back that his heart was broken."

I saw from his manner that something was amiss with him. I could not conceive what it might be, because I had been so well pleased with the result of my treatment of his daughter that I thought he should be too. He handed out the money with scarcely a word, and I gave him a receipt, but I saw that he had something on his mind, and finally he said, rather irritably, "I want my daughter's teeth filled with gold." "Oh, no," said I, "you do not; you think you do, but you don't." "And pray, why not?" said he. "Because," said I, "you wish to save her teeth, I know, and they cannot be saved with gold." "Well!" said he, with some heat, "I had *my* teeth filled with gold thirty years ago, and it saved *them*." "Very likely," said I; "but unfortunately your daughter has not inherited the excellent quality of her father's teeth, and they require very different treatment for their salvation." "Oh, well," he replied, "I suppose you dentists can use this cheap putty stuff so much easier, and charge just as much for it as you would for gold—" "Doctor," said I, interrupting him, "do you base your charges for professional services on the cost of your prescriptions?" "No, sir!" said he, indignantly. "Neither do honorable dentists base their charges on the cost of the materials they use," said I; "and while your daughter remains in my hands, I must be permitted to use my own judgment as to the manner in which her teeth shall be cared for. Good-morning, sir!" Whereupon he withdrew, not a little ruffled, but I think somewhat enlightened.

Dr. S. G. Perry. In the October number of the *Dental Review* there appears a short article written by Dr. William Mitchell, of London, in which he says, "About seven and a half years ago, Dr. S. G. Perry, of New York, implanted a tooth, which was lost by absorption eighteen months later. A new tooth was obtained, which was also lost from absorption about three years ago. A suitable tooth not being found, an artificial tooth was procured and secured in place. Some time after, the patient presented herself to me for treatment, the porcelain face having become displaced. The three things that impressed me in connection with this case were the enthusiastic persistence of Dr. Perry, the non-absorption of the tooth, the gingival margin retaining its place, and also the perfect immobility of the tooth, it evidently being a case of true ankylosis."

This last tooth which Dr. Mitchell considered so successful, or rather the root with the artificial crown, which had been very solid, also loosened from absorption and came out last August. The patient went to a country dentist, who said there was nothing to do but have a plate. He made a small plate for her, with one tooth attached, and put it in. She had had so much comfort with this implanted tooth that she did not abandon her hope of implantation, and although she allowed this dentist to make the plate for her with a single tooth, she filled the little cavity in the gum, which was not quite so deep as in this model, with a little roll of cotton saturated with listerine, hoping to keep the socket open for the implantation of another tooth on her return to New York in the autumn. In September, as the result of her visit to the country, she was taken with typhoid fever. After the fever abated, she had a severe attack of diphtheria, and she barely pulled through. She kept up this treatment of the little roll of cotton put into this open place in the gum, always moistening it with listerine, as long as she was able to do it after she was ill; and comprehending that she might become delirious, she gave instructions to the nurse to continue to change the cotton from day to day. This the nurse did for her, not only through the illness of typhoid fever, but also through the diphtheria. She was not able to come to my office until the week before last. That is a period during which she wore the cotton in this open place of about six months. She came in the other day, and I deepened the socket and shaped it to my liking, and implanted another root, and on that put another crown, and when that was in place, took an impression, from which the cast was made which I now show you. That operation was performed last week, on Wednesday. Directions were given to her to come to me if there was any annoyance. I have not seen nor heard from her, so I think it must be comfortable.

This case, it seems to me, is worth presenting, as showing what can be done in the way of keeping a socket in condition for receiving another tooth. This tooth may fail in time, and yet another one can be put in. The patient will tell you that the operation of each insertion was not at all painful, comparatively, as, of course, in each case cocain was used.

If the members of our profession will have a little more faith in implantation, and more persistence in case of failure, I am sure it can be made of real service to our patients. I consider it a legitimate operation, and I do not by any means become discouraged because of failure.

Dr. Hill then welcomed the members of the First District Dental Society, and called upon Dr. Carr to preside.

Dr. Edward C. Kirk, of Philadelphia, read a paper entitled, "The Use of Coagulants in the Pulp-Chamber and Canals."*

Discussion.

Dr. Kirk. I want to call the attention of Dr. Heitzmann and some of the histologists present to the fact that the thickest portion of the tooth seemed to be the most porous, and that the coloring has been more intense at the neck than at the apex of the root

Dr. C. Heitzmann. I am not a dentist, as you know. What I have heard to-night is a perfect revelation to me. Have you gone as far as to recognize the dentinal canaliculi and the dentinal fibers? That is wonderful. Do you take into account the micro-organisms growing there? I am surprised. I had to fight for years until I reached the point to show what dentinal fibers are, and now you come and deal with the possibilities of living vegetable organisms doing harm there, even though the pulp be destroyed. What I can tell you from my own knowledge is this: Dr. John I. Hart, of New York, several years ago, made experiments with chlorid-of-gold stain in my laboratory, which plainly showed that in a living tooth—that is, a tooth that was alive at the moment of extraction—there is a fiber in the center of the canaliculus which stains deeply with chlorid of gold, has vacuoles in its interior, is a succulent filament that goes down to the odontoblasts, or, in the fully developed tooth, between the rows of medullary corpuscles, in place of odontoblasts. The dentinal fibers send offshoots into the basis-substance of the dentine, which is calcified to a high degree. When Dr. Hart stained teeth which he knew were dead, things looked quite different [illustrating]. Instead of having a succulent fiber, you have a miserable, tiny, shriveled affair. Now, gentlemen, you can imagine that this little bit of dry stuff left in a dead or devitalized tooth cannot be conducive to organisms, for they know where to settle. Such dry stuff will never suit their taste; even if they should be there at the moment of death, they will die off with the dentinal fibers. I do not see how there can be the least danger in having micro-organisms in the dentinal canaliculi, where there is nothing to feed on. If there be living matter, which, as you know, is my definition of the dentinal fibers, there is a possibility that they should settle and propagate; but as soon as the dentinal fibers die, everything around and within them will die too I have seen quite a number of specimens which Dr. Herbst, of Bremen, sent to Dr. Bödecker, two years ago, where cobalt had been resorted to for destroying a certain part of the pulp. I don't know whether the gentlemen claim that cobalt is a coagulant or not. It mummifies the tissue, but it does not destroy it. I think we can call it a coagulant, can we not, Dr. Kirk?

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*See March Dental Cosmos, page 181.

Dr. Kirk. I am not sure of that, though under the circumstances I believe it might be a coagulant.

Dr. Heitzmann. I have seen pulps treated with cobalt in which the tissues were recognizable, although much shriveled up, and there were micro-organisms both in the pulp and in the adjacent mouths of the canaliculi. The cobalt did not penetrate, yet everything was dead. You know that the marvelous outcome of these experiments of Herbst was that, even though you coagulate the crown portion of a pulp, but save the root portion, the whole tooth remains alive, so much so that the micro-organisms were killed only where they came into contact with the cobalt, whereas the dentinal fibers were perfectly alive all through the crown. This is a very important fact, I think.

There are some very fine speculators—hair-splitters, I should say—who claim that if the mouth of a tubule in which there is dead material is choked up, it will not allow the penetration of antiseptics; but is there any need for antiseptics after what I have said? Everything is killed within the tubules. Are you ever in a position to resort to antiseptics in the dentine after coagulants have been applied, Dr. Kirk?

Dr. Kirk. It is an open question, but on general principles I believe we are, and I should be inclined to take exception to your statement that antiseptics are unnecessary after simple coagulation of the contents of the tubule at the orifice.

Dr. Heitzmann. From a merely histological standpoint, I should think there was no material to destroy. Everything is dried up and killed,—not only the dentinal fibers, but also the micro-organisms.

Dr. Perry. Can they be dry in the mouth?

Dr. Heitzmann. Under the microscope it was certainly dry. There is a possibility that, through the live pericementum, some nourishing material might get in. Dr. Roy, of New Orleans, has tried hard to settle that question, but without success. Even though he tried to find traces of life in the cementum of a devitalized tooth, he did not succeed.

Dr. Perry. It might be dead, but I do not think it is dry.

Dr. Heitzmann. I used the word "dry" in its broadest sense.

Dr. Perry. How do you account for the fact that a rapidly revolving bur in a dead tooth liberates a disagreeable odor?

Dr. Heitzmann. That is organic material. We have glue there, and if that is heated, it will smell badly; but that is not the living matter of which we are speaking. I do not conceive how the lime-salts and the glue left in the basis-substance should furnish material for the micro-organisms.

Dr. Kirk. It has been claimed that the organic matter in the dentine structure may, by itself, decompose, and produce septic gases which will diffuse out and irritate the peridental membrane. A tooth in which the pulp has died eventually becomes discolored, and we can, by treating that tooth, restore the color to normal. There is some decomposing organic matter in the tooth-structure, but how far that produces pericemental inflammation, aside from apical pericementitis, I cannot say. I should suppose it would be a source of irritation.

Dr. Heitzmann. As far as I can see, I do not realize the possibility that dentine, after the pulp-chamber has been filled with the coagulant, should ever give rise to a growth of micro-organisms which could irritate the pericementum. There are many other sources which could account for it. To be sure, what Dr. Kirk has demonstrated cannot be contradicted. He has shown that these so-called tubules are susceptible to osmosis. A wonderful fact is that at the neck the osmosis is the liveliest. At the neck, the dentinal canaliculi stop short, as John Tomes first discovered. They do not reach the surface at all. Bödecker has shown the existence of a very coarse reticulum just in this layer [illustrating], and the reticulum being light in his chromic-acid specimens, he merely concluded, on theoretical ground, that this reticulum is the living matter held within the spaces of the basis-substance. Dr. John I. Hart several years ago attempted, by prolonged staining with chlorid of gold, to bring out this reticulum, and the result was marvelous. The dark violet stain assumed by the dentinal fiber could be traced in this reticulum, which here proved to be very coarse, much coarser even than higher up at the interzonal layer between dentine and enamel,—a fact which fully accounts for the extreme sensitiveness of the neck region. Every practitioner knows that that is the worst place in the tooth to work upon.

Dr. Rhein. On that account, would it not be easier for moisture to pass in from the pericementum at that point, especially in some teeth where we get extra large spaces right near the neck? We get an opening there that is sometimes taken for a false opening of the pulp-chamber. It is possible that that is often a means of the entrance of moisture from without, and for the egress of septic matter from within outward.

Dr. Heitzmann. It is not settled that any septic matter could progress from within outward.

Dr. Rhein. We find the openings. We can put a drill through those openings frequently.

Dr. Heitzmann. It is possible that moisture or serum from the pericementum could pass through. The life, according to Roy's investigation, is destroyed. The discoloration plainly shows that.

Dr. Rhein. The moisture could act on any dried-up tissue that might be in the canaliculi. If the moisture came from within or without, it could act on any dried-up organism. I know that we frequently get moisture in that way in roots that are pulpless.

Dr. Heitzmann. Can that be a carrier of micro-organisms, and, if so, can it do harm?

Dr. Rhein. My impression is that it does.

Dr. Heitzmann. The discoloration might perhaps be explicable in that way, although there are other ways to explain it. The answer, therefore, to the experiments of Dr. Kirk is that in the region of the neck is the widest reticulum in the basis-substance. Altogether, I am glad to have heard his explanations. They are logical from the first to the last, and I must confess it is remarkable to my mind that some of the gentlemen have passed so far as to claim what they do. I would never have thought that there was the slightest danger in choking the mouth of the canaliculi; but since the assertion was made, I am convinced that what Dr. Kirk claims is correct.

Dr. George Evans. As I interpret it, Dr. Kirk's intention, in his present paper, is to show that in the use of agents, coagulants of albumen, in the treatment of pulpless teeth, their action is not limited to the canal and orifices of the dentinal tubuli, when the application in sufficient quantity is prolonged, and that he is not indorsing coagulants as pre-eminently the most suitable in the treatment of different classes of pulpless teeth, either as disinfectants, antiseptics, or sterilizers, and that he leaves us to infer he will favor us with a presentation of scientific facts regarding the effectiveness and suitability of different therapeutic agents, in a subsequent paper.

Regarding the experiments of Dr. Kirk, I think that in the dentine, owing to the capillarity of its structure, capillary action is as active as osmosis; and if a glass tube is to be compared to a dentinal tubule, it would have to be of proportionate size.

A dentinal tubule is estimated to be about $\frac{1}{4500}$ of an inch in diameter. To compare a tubule, say $\frac{1}{15}$ of an inch in length, with a glass tube one inch in diameter, it would have to be 4500 times as long, which would be three hundred inches or twenty-five feet,—a tube one-half inch diameter, twelve and one-half feet and one-fifteenth of an inch in diameter, one foot eight inches long.

The coagulation of albumen in any of these tubes by application of an agent for the purpose, even in excess, will evidently take time, and in proportion much more than in a dentinal tubule, consequently I am much inclined to infer that owing to the structure of the dentine capillary action will, as I have already stated, play as active a part in the permeation of the dentine with the agent employed as osmosis.

In the treatment of pulpless teeth we have the dentine in one of the following conditions : first, where a healthy pulp has been removed from the canal, leaving the dentine in an aseptic condition ; second, where the pulp has recently become devitalized, and not having been removed, becomes septic and the contents of the tubuli proportionately so ; third, where the tooth has long been pulpless and the dentine is aseptic or septic, as the case may be.

In the first and second conditions, the subject of coagulation may be considered, as the tubuli are filled with albuminous matter, the former aseptic, the latter septic. In the third form, the tubuli are in a partially empty condition, owing to the gradual decomposition of their contents.

In the first form, as evidenced by Dr. Kirk, by a single application of a coagulant, as in "immediate root-filling," the orifices of the tubuli will only be affected, as the prolonged presence of the agent is necessary to coagulate the whole tract.

In the second form, a prolonged application is necessary, especially to effect the elimination of septic gases, which are evidently obstructed by coagulation. For this reason I consider coagulants should not be used as disinfectants.

In the third form, as the tubuli are partially empty, and as what might be termed albuminous matter is not present, obstruction to the entrance of any agent is not offered as in the first and second forms, nor is the subject of coagulation in the same sense to be considered. Dr. Harlan undoubtedly made too broad a statement regarding coagulants, as by continued or repeated application saturation of the dentine is possible.

Dr. Kirk's paper presents for our consideration facts of great importance in the treatment of pulpless teeth.

We are already indebted to him for much scientific information on the subject. I accordingly look forward with interest to what he will yet advance regarding the suitability of agents classed as coagulants and non-coagulants in the different forms and stages of treatment of such teeth, as I consider the present discussion, as commenced by Dr. Kirk, is by no means ended.

Not knowing whether Dr. Kirk would have the tubes with him, I brought some. The results, I find, are about the same. Although the materials in this have been in contact nine days, it has not coagulated the albumen in the lower part of the tube, consequently it is limited to the upper portion. I placed the albumen in the tube first, the carbolic acid being placed above it, and stirred it with a probe. I tied a silk thread on, to mark the surface of contact, and the result is just the same as Dr. Kirk has shown.

Many dentists apply arsenic on pulps and do not seal it up perfectly, and dismiss the patients. Naturally, the fluids permeate into the pulp-cavity. I am very particular to seal up my cavities hermetically.

If I expect to disinfect dentine, I never use a coagulant first ; afterwards I might, but I do not use it before using the antiseptics.

In experimenting on a tooth with coagulants and non-coagulants, you must consider whether it is a dead tooth or one that is freshly extracted.

Diffusion takes place through the walls of the root toward the apex, which is almost entirely composed of cementum, as diffusion through the interzonal section must be of the most limited character. If you take a long, thin root, it is transparent toward the apex, and that portion shows great vascularity.

Dr. Rhein. There is no question, I think, in the minds of any of us, but that Dr. Kirk has logically proven the fact that osmosis will take place through the coagulated tissue that is formed, and that the agents producing coagulation continue to penetrate the tooth structure, even to outside of the pericementum. Notwithstanding the proof which he gives, I think it is a serious question, and one that it is very hard to determine at the present time, whether the doctrine enunciated by Dr. Harlan is not, nevertheless, the proper one to carry out in practice. To a limited extent, I must agree in that respect with the last speaker, Dr. Evans. My reason for that is that if a coagulating antiseptic is used at the outset, the material that is used at once coagulates the canaliculi around the periphery of the canal, and our filling-material will not penetrate beyond that point of coagulation. In speaking of peroxid of hydrogen, Dr. Kirk spoke of one of its qualities, which is more or less true of all our therapeutic agents, that a certain amount of their potential activity is unquestionably lost after a certain length of time. It is a very serious question whether, after the lapse of ten or fifteen years, an amount of coagulated material left in a root of that kind will not have lost so much, if not all, of its antiseptic properties, that we have present there a very nice feeding-ground for micro-organisms, notwithstanding the statement of Professor Heitzmann to the contrary. This is the only point that I can find in the paper from which to argue,—that the practice advocated by Dr. Harlan is, perhaps, a better one, practically, to follow out, as was indicated by the last speaker. Remove as much of the septic material from the root as possible before applying coagulating material, so that the root-filling, whatever it may be, will penetrate as far as possible into the canaliculi when it is used.

Dr. W. W. Walker. Would Dr. Rhein have us infer that all the little canaliculi in the root of a tooth can be filled?

Dr. Rhein. That has been settled many years ago in New Jersey.

Dr. Walker. I must disagree with the doctor. Some experts in filling roots claim that they can fill the canaliculi with soft gold right up to the end. Others claim they can do it with tin. I looked over many specimens that were prepared by Dr. Bödecker, and some by Dr. Frederick Levy, now dead, and failed to discover any filling whatever in the canaliculi.

Dr. Heitzmann. Of course, if pressure is exerted into a cavity after it is cleansed, excavated, and filled with amalgam, no doubt amalgam will penetrate; but that a mere stuffing of the pulp-canal will ever lead to a filling of the dentinal canaliculi, I doubt. From above I have seen it, but not from the root.

Dr. Nash. One important point, I think, was brought out which applies to the use of arsenic. In using this agent for devitalizing pulps and sealing up the cavity, with a due recognition of the danger of leakage, is it not possible that the irritation around the necks of the teeth, which we occasionally observe, may result from this diffusibility of the arsenic penetrating through the tooth?

Dr. Perry. What becomes of the air that is not only in the canals themselves, but in the canaliculi? Dr. Walker speaks jokingly of filling the canaliculi. I wonder how many of us fill even the root-canals properly! Think of talking about the canaliculi or even the minute canals as if we could fill them! It is absurd on the face of it. We can render their contents inert, but it is a waste of time to talk of filling them. There are some important points brought out in Dr. Kirk's paper. I think the experience throughout the professional world bears out the statements he has made. Oxychlorid of zinc is to-day conceded to be the best material for filling the roots of teeth, and I have no doubt its action is that described in the paper. I think it is possible to preserve the contents of the tubuli by the use of remedies in this way, and if it could be carried further and applied to the pulp it would be a point gained, for nothing can fill the roots of a tooth so well as its own pulp. I do not know whether it is altogether fair to treat albumen in the test-tube and consider that it is the same as in the tubuli of the tooth. It is nearly so, doubtless, but I am not sure that it is entirely so. Of course we are considering teeth generally, but they are very different if they are young or middle-aged or elderly teeth. I believe the roots of teeth at middle life, or later, can be filled in such a manner as to allow no germ-action to go on; but I think young teeth contain so much animal matter that germ-life is sure to exist in them, unless it can be checked on the principle demonstrated by this paper.

Doubtless all of us, in the early days when oxychlorid of zinc was used for capping pulps, remember seeing many cases where the pulps died, and yet were preserved so that no trouble ever came from them. They seemed to be coagulated and rendered harmless, and yet filled the tooth like a filling.

Dr. Nelson T. Shields. I think it is one of the most important papers we have ever had presented. The coagulation that takes place in the canaliculi is a most important feature. If a root is thoroughly sterilized and the canal thoroughly filled to its apex, I think we could safely guarantee that a root so treated would never give trouble.

Dr. Jarvie. In the discussion to-night, the main point of the paper is being overlooked. The point made in the paper is that coagulants introduced into the pulp-canal will penetrate the tubuli and cause them to filled up with the coagulum The essayist does not claim that that is the wisest way to treat the tooth. The point is not as to the coagulant being the best agent to use, but having used it the process is as has been described. Dr. Walker has jocosely spoken of filling the canaliculi. I think the essayist has proven very conclusively, by the test-tubes shown to us to-night, that he can fill the canaliculi, not with soft foil or tin, but with a coagulum formed by the chlorid of zinc. It seems to me that those of us who are not scientific enough to have prepared such a paper or demonstrated it as the essayist has done, can take advantage of what he has given us. I think this process of osmosis that has been so beautifully demonstrated to us, showing the tubuli to have been penetrated by the coagulant, and so on through the cementum, indicates that the osmosis may take place in the reverse order; that roots may absorb moisture from the socket, through the cementum, and into the tubuli; and this may be the solution to us of how teeth which we think have been thoroughly treated and restored to a normal color become dark again. There is much food for thought in this paper, and, while I cannot offhand discuss it in all its points, I hope to get a great deal of benefit from it. I wish, on behalf of the gentlemen present, to thank the essayist for his very able paper.

Dr. Walker. I did say in regard to filling the root, that up to the present time it has not been demonstrated to us how the canaliculi can be filled. Dr. Kirk has demonstrated how it can be done in a tube, and I would suggest that we invite Dr. Kirk to do it for us in the mouth, Mr. President, at one of our clinics.

Dr. Evans. Dr. Heitzmann stated that in many pulpless teeth there was was no albumen present in the tubules. How can a coagulant fill a tubule with coagulated albumen under such conditions?

Dr. Hill. I do not profess in any way to discuss this paper scientifically. If I understand it at all, it proves chemically and scientifically what we, as dentists, have been practicing for years,—that what we introduce into the canals of the teeth really penetrates the tooth itself. I have discovered that people have used all kind of medicines empirically, and afterward the chemists get hold of them and analyze them, and tell us what they really do. We know that calomel produces certain effects, but how we do not know. Dr. Kirk read a paper before this society a year ago. I am going to give my experience with one single tooth. It was a lateral incisor, and this is a question proving to my mind, and it has proven to our minds for years and years, that whatever we have put into a tooth has penetrated that tooth. A lady came to my office with a tooth that I had filled fourteen years ago. It had decayed on the opposite side, and had been filled by some one with a phosphate filling. The tooth was abscessing and discharging, and it was quite dark. I removed the gold filling, and found it very clean around the filling. I removed the filling, as I usually do in all those cases, and pumped it out with a broach wound with cotton, before I put anything in it at all; then I took the peroxid of sodium which Dr. Kirk told us about. I pumped it up this tooth quite thoroughly, filled it up with cotton, putting in a little loose cotton to protect the soft tissues. I turned and went into my side room, and was not gone more than two or three minutes. The lady had a hand-glass, and when I came out she said, "Look at my tooth; it is as nice and white as the others." Does not that prove that what I put into that tooth did something? It must have penetrated. We have never had anything that accomplishes the same result as this peroxid of sodium. I have not used anything else for about six months. How can a tooth become dark unless something is changing inside of it? It certainly does not get black from the outside.

If you have never used peroxid of sodium, and have never read Dr. Kirk's paper, which appeared in the COSMOS of March, 1893, you have lost something, and you cannot afford to be without it. Dr. Van Woert and Dr. Turner have used it also. I treat abscessed teeth with nothing else. I asked Dr. Kirk, at the time he read his paper, if he had pumped it through the root. Dr. Kirk would not commit himself, and said he had not done that. I have done it, however, a great many times, and nothing will cure an abscess as quickly as the peroxid of sodium.

Dr. Nash. Do you use it in solution?

Dr. Hill. In solution. Dr. Van Woert prepared it for me.

Dr. Van Woert. I am rather glad that Dr. Hill has brought up the question of peroxid of sodium in connection with this subject, as I have formed a love for it that it would be hard for me to break. I want to warn, at the beginning, those who have not used it, of the necessity of great care in its preparation. Several gentlemen, who were present at that meeting, had some of the peroxid of sodium in powder given to them. Dr. Kirk gave me a can, and told me to distribute it as far as it would go, which I did; but several reported to me that they could not see anything in it. I found two or three had made solutions inside of ten minutes. It takes me from three to eight days to make a solution as I think it ought to be made, from what I digest of Dr. Kirk's paper. The results accruing from the use of it, as Dr. Hill says, are most marvelous. I am not chemist enough, neither am I in the position, to go into the details of its chemical action on the teeth; but as I said before the First District Dental Society, not very long ago, in speaking of the use of coagulants, I consider it unwise to cast aside those bridges that have carried us safely over the stream. I was speaking of carbolic acid then, and I have as great a love for it to-day as I ever had, excepting, of course, its odor. We must be careful not to accept a theory and worship at the shrine of some one who has advanced a theory, simply because they advance it. There is a possibility that they may be mistaken. This preparation of peroxid of sodium I accepted at once, partly because Dr. Kirk recommended it, and partly because it was easy to understand its action in a superficial way. I gave it to several gentlemen present that evening, and they all reported the same favorable results.

Dr. Kirk. I want, in the first place, to express my deep gratification and appreciation for the manner in which what I had to bring before you has been received and discussed; but in the discussion there seems to have been one element of misunderstanding, and that is, that I have been advocating the use of coagulants. I had no such intention. I wished to correct the error that coagulants cease their coagulating action simply at the orifices of the dentinal tubuli, and did not penetrate further. I think the action I have shown to take place throughout the dentine really takes place. It is perfectly clear that coagulants are absolutely useless in the treatment of teeth devoid of albuminous matter. If there is no albumen there, they cannot coagulate it. If, however, they have antiseptic qualities, they might be of advantage for that reason. We have seen what seems to be of equal importance to the coagulating property, and that is, the power of these agents to diffuse entirely through the structure of a root. It is perfectly possible, on theoretical grounds, to my mind, to fill a root with zinc chlorid, and leave such a dressing in a root long enough to produce a chemical irritation of the pericementum by osmosis. I think it is possible to do the same thing with arsenic, in over-treatment with arsenious acid or with any other such substance. We want to bear in mind that these materials which we have considered as self-limiting are not so. We may get a good or a bad action from coagulants. The subject of the comparative value of treatment by coagulants or by the method of dissolving out all the organic matter, has been spoken of. The question is upon the value of that treatment as compared with the coagulant treatment. My own method is to remove as much of the albuminous organic matter from the dentine as possible, and then fill it with some inert aseptic substance. Dr. Evans said something which I did not quite understand, and that was his statement in regard to the difference between capillary attraction and osmotic action. In my paper, I think I clearly stated that osmotic action is due to, or dependent upon, capillary attraction.

Adjourned.

HARVARD ODONTOLOGICAL SOCIETY.

THE sixteenth annual meeting of the Harvard Odontological Society was held at Young's Hotel, Boston, Saturday, February 24, 1894, at 5.30 P.M.; the president, Dr. Forrest G. Eddy, in the chair.

The annual reports of the recording and corresponding secretaries, treasurer, and editor were read and accepted. The recording secretary stated that during the past year papers with the following titles were read before the society:

"The Dentist as a Prescriber of Drugs;" "The Properties of Hydrogen-Peroxid Solution;" "Should We have Specialties in Dentistry?" "Prophylaxis in Dental Operations;" "Cocain;" "Foods;" "Injurious Effects of Amalgam Fillings;" "The Most Venerable and Honorable of Sciences: a Medical Papyrus of the Nineteenth Dynasty;" "A Few Words on Homœopathy;" "Porcelain Contours;" "The History and Clinical Appearance of Syphilis, with Especial Reference to the Dangers arising from the Oral Manifestations;" "American Dentistry in London."

At every meeting, save two, members had presented for inspection specimens or models in the line of dentistry.

Among the guests present were: Hon. Geo. A. Marden, Lowell, Mass.; Hon. Chas. H. George, postmaster, Providence, R. I.; Rev. Chas. G. Ames, Boston; Louis A. Brandeis, LL.B., Boston; Hon. Wm. F. Sawyer, president Massachusetts College of Pharmacy; Rev. Alexander McKenzie, D.D., Cambridge, Mass.; Hon. Henry H. Sprague, Boston; Rev. F. W. Merrick, Boston; G. A. Leland, M.D., Boston. His Excellency, Gov. Greenhalge, was unable to be present, but the state was represented by Adj.-Gen. Dalton.

The orator of the evening, Geo. F. Grant, D.M.D., Boston, gave an interesting and instructive paper on "The Development of our Profession."

The following-named officers were elected for the ensuing year:

Forrest G. Eddy, D.M.D., Providence, R. I., president; Waldo E. Boardman, D.M.D., Boston, recording secretary; James Shepherd, D.M.D., Boston, corresponding secretary; Dwight M. Clapp, D.M.D., Boston, treasurer; Henry L. Upham, D.M.D., Boston, editor. Executive Committee: Waldo E. Boardman, D.M.D., Boston; Jere E. Stanton, M.D., D.M.D., Boston; A. H. Stoddard, D.M.D., Boston.

W. P. Cooke, D.M.D., Boston, was elected orator for 1895.

JAMES SHEPHERD, *Cor. Sec.*

CENTRAL DENTAL ASSOCIATION OF NORTHERN NEW JERSEY.

At the annual meeting of the Central Dental Association of Northern New Jersey, held at Newark, February 19, 1894, the following officers were elected for the ensuing year: Dr. Thos. Moore, Paterson, president; Dr. Wm. P. Richards, Orange, vice-president; Dr. Wm. L. Fish, secretary; Dr. Chas. A. Meeker, Newark, treasurer; Drs. Geo. E. Adams, South Orange, Oscar Adelberg, Elizabeth, Fred. A. Barlow, Jersey City, Walter Woolsey, Elizabeth, Wm. E. Linsted, New Brunswick, executive committee.

Wm. L. Fish, *Secretary.*

WOMEN'S DENTAL ASSOCIATION OF THE UNITED STATES.

The second annual meeting of the Women's Dental Association of the United States was held at the office of Dr. Mary H. Stillwell, 1300 Arch street, Philadelphia, Saturday evening, March 3, 1894.

The following officers were elected for the ensuing year: Dr. Anna T. Focht, president; Dr. Elizabeth A. Davis, vice-president; Dr. Emily W. Wyeth, recording secretary; Dr. Eliza Yerkes, corresponding secretary; Dr. Matilda Groth, treasurer; Drs. Mary H. Stillwell, Edith L. Brown, Hannah M. Miller, Martha C. Corkhill, and Maria Lasser, executive committee.

The vice-presidents from representative states were re-elected, except that in New York Dr. Alice Ireland takes the place of Dr. Olga Neyman Glücksman. Dr. Cora J. Little, of Nebraska, Dr. Sara May Townsend, of Colorado, and Dr. Mary Weston, of Missouri, were added to the list.

The membership, thirty-two at the close of the first year, now numbers forty-three. Next monthly meeting at 1300 Arch street, Philadelphia, April 7, 1894. Dr. Matilda Groth, essayist.

Emily W. Wyeth, *Recording Secretary*,
3920 Fairmount avenue, Philadelphia, Pa.

ALUMNI SOCIETY OF THE PHILADELPHIA DENTAL COLLEGE.

The annual meeting of the Alumni Society of the Philadelphia Dental College was held in the college building, on Wednesday, March 7, 1894.

The following papers were read: "Abnormalities of the Teeth and Hair and their Relations," by S. H. Guilford, D.D.S., Ph.D.; "A Suggestion for Crowning Broken-down Roots of Teeth," by Henry McManus, D.D.S., Hartford, Conn.

Officers for the ensuing year are: Dr. Jeffries, president; Dr. Henry McManus, vice-president; Dr. Maria Lasser, treasurer; Dr. Simeon H. Guilford, corresponding secretary; Dr. Lev. Greenbaum, recording secretary.

DENTAL COLLEGE COMMENCEMENTS.

PENNSYLVANIA COLLEGE OF DENTAL SURGERY.

THE thirty-eighth annual commencement exercises of the Pennsylvania College of Dental Surgery were held at the American Academy of Music, Philadelphia, on Thursday, March 8, 1894, at 12 o'clock M.

The annual address was delivered by Professor Henry Leffmann, M.D., D.D.S.

The number of matriculates for the session was two hundred and seventy-three.

The degree of D.D.S. was conferred on the following graduates by I. Minis Hays, M.D., president of the board of corporators:

NAME.	STATE OR COUNTRY.
F. R. Adams	New York.
Martha B. Allaire	New York.
R. D. Ambrose	Pennsylvania.
J. S. Anderson	Canada.
H. W. Bender	Pennsylvania.
Carl Bischof	Germany.
C. W. Boyer	Pennsylvania.
Louis Britton	Pennsylvania.
A. G. Brown	New York.
H. W. Burchell	Canada.
E. E. Clark	Pennsylvania.
Alex. Cornish	Pennsylvania.
B. A. Feltwell	Pennsylvania.
L. H. Fisk	Connecticut.
R. E. Forster	Pennsylvania.
L. D. Fisher	Louisiana.
L. McC. Gibbs	Virginia.
W. A. Green	Maryland.
F. L. Grier	Delaware.
F. A. Hall	Minnesota.
F. H. Hallen	England.
Theo. R. Harvey	Pennsylvania.
H. E. Hager	Pennsylvania.
Laura K. Hafer	Pennsylvania.
J. G. Harter	Pennsylvania.
W. S. Hess	Pennsylvania.
E. R. Hearn	Pennsylvania.
Marie J. Hyndman	Pennsylvania.
A. J. Irwin	Canada.
A. W. Johnson	New York.
George C. Knox	Pennsylvania.
H. B. Littell	Pennsylvania.
James L. Lord	Pennsylvania.
Vedder Marcellus	New Jersey.
W. B. Martin	Pennsylvania.
J. R. Megraw	Missouri.
A. B. Miller	Pennsylvania.
L. M. Monroe	Pennsylvania.
H. W. Monroe	Pennsylvania.
W. T. Morton, M.D.	Pennsylvania.
G. B. Murray	Pennsylvania.
Harvey McAdam	Canada
Eugene Pettit	Pennsylvania.
E. L. Pitcher	New York.
Rudolph Probst	Switzerland.
H. W. Reid	New York.
F. Dell Rhodes	Ohio.
R. H. Savage	Pennsylvania.
H. C. Stout	Pennsylvania.
C. B. Schupack	Pennsylvania.
George A. Slick	Pennsylvania.
J. W. Story	Pennsylvania.
Paul Scheidt	Germany.
J. Alberto del Solar	Chile.
E. A. Thayer	Tennessee.
G. W. Troth	Pennsylvania.
C. J. Van Horn	Pennsylvania.
J. Wells Van Valzah	Pennsylvania.
A. M. Waas	Pennsylvania.
Alex. Watson	Canada.
Ira G. Wells	New York.
B. B. Williamson	New York.

PHILADELPHIA DENTAL COLLEGE.

THE thirty-first annual commencement exercises of the Philadelphia Dental College were held in the Chestnut Street Opera House, Philadelphia, on Thursday, March 8, 1894, at 12 o'clock M.

The address to the graduates was delivered by Professor S. B. Howell, M.D., D.D.S., and the valedictory by Samuel H. Miller, D.D.S.

The number of matriculates for the session was two hundred and ninety-nine.

The degree of D.D.S. was conferred on the following graduates by Professor S. B. Howell:

NAME.	STATE OR COUNTRY.
John C. Amig	Pennsylvania.
John W. Anderson	Pennsylvania.
Harry T. Avery	Pennsylvania.
Willard H. Barnes	New York.
Nils Berg	Sweden.
Horace H. Bigelow	Nova Scotia.
Godwin M. Brown	North Carolina.
W. A. Burns, L.D.S.	Canada.
Nellie M. Carle	Pennsylvania.
M. J. Cogan	Canada.
R. W. Collins	Canada.
S. E. A. Daniel	West Indies.
F. E. Davis	Iowa.
Robert Lent Davis	Rhode Island.
T. H. Dawes	New Jersey.
W. J. Devereaux	Massachusetts.
A. B. Dorland	Michigan.
Fred N. Duncan	New Jersey.
J. J. Eckel	Pennsylvania.
G. W. Filbert, Jr., B.S	Pennsylvania.
W. S. Flower	Pennsylvania.
A. J. Foret	Louisiana.
H. H. Forsythe	Canada.
T. E. Fouser	Illinois.
T. W. Gabel	Pennsylvania.
Percy D. Greene	New York.
E. Greenwood	England.
D. J. Griswold	Illinois.
N. C. Heaton	Pennsylvania.
Lynn Himel	Louisiana.
A. Hinman, Jr	Oregon.
O. C. Hole	Illinois.
Will Holloway	Ohio.
Frank M. Howard	Pennsylvania.
A. A. Humber	British Columbia.
P. A. Hymel	Louisiana.
H. G. Jaquess	Illinois.
A. L. Jenkins	Pennsylvania.
Charles E. King	New Jersey.

NAME.	STATE OR COUNTRY.
W. B. Lapham	New York.
Will. H. Lawrence	California.
M. J. Lossing	Canada.
C. R. McDermott	Massachusetts.
T. F. Marovici	Roumania.
J. T. Marsden	Pennsylvania.
William Mason	Canada.
Edwin S. Mershon	Pennsylvania.
S. H. Miller	Pennsylvania.
Robert Milligan	Pennsylvania.
H. P. Moody	British Columbia.
Norman H. Myers	Pennsylvania.
Homer Palmour	Georgia.
Geo. B. Parker	New York.
A. E. Preston	New York.
A. D. Quick	New York.
J. Maude Rankin	New York.
L. H. Reinhart	Pennsylvania.
Chas. F. Rodbard	Pennsylvania.
M. E. Rummel	Ohio.
M. P. Shoemaker	New Jersey.
W. D. B. Spry	Canada.
C. H. Steele	Texas.
Roger Steib	Louisiana.
J. E. Stevenson	Wisconsin.
W. F. Sullivan	Alabama.
W. A. Taft	New York.
Chas. M. Taylor	Pennsylvania.
Otto Tellefsen	Norway.
J. W. Thatcher	Utah.
J. F. Thomas	Pennsylvania.
G. L. D. Tompkins	New Jersey.
D. S. Wells	Vermont.
C. E. Wettlaufer	Canada.
Fred. C. Whiting	France.
H. Putnam Wisely	Canada.
S. E. Worster	Kansas.
Martin Zobel	India.

KANSAS CITY DENTAL COLLEGE.

THE twelfth annual commencement exercises of the Kansas City Dental College were held in the Grand Avenue M. E. Church, Kansas City, Mo., on Monday evening, March 5, 1894.

The faculty address was delivered by Alton H. Thompson, D.D.S.

The number of matriculates for the session was one hundred and thirteen.

The degree of D.D.S. was conferred on the following graduates by C. B. Hewitt, D.D.S., president of the faculty :

NAME.	STATE.
James Arthur Miller	California.
James Burns Brady	New Mexico.
Charles Nelson Rathbun	Iowa.
Joseph Edgar McKee	Missouri.
Harry Evert Duncan	Kansas.
John Hockaday Galliher	Missouri.
Schuyler Wallace Pile	Kansas.
Ellsworth L. Rothrock	Kansas.

NAME.	STATE.
Charles Channing Allen	Kansas.
Augustus Morton Wilkes	Kansas.
George Thomas Reily	Missouri.
Richard Andrew Millen	Missouri.
Archibald Benjamin Stote	Kansas.
Abram Thompson	Kansas.
Eugene Wesley Allendorph	Kansas.
Henry A. Kinnan	Iowa.

NEW YORK COLLEGE OF DENTISTRY.

The twenty-eighth annual commencement exercises of the New York College of Dentistry were held at Chickering Hall, New York city, on Tuesday evening, March 13, 1894.

The valedictory was delivered by William C. Beecroft, D.D.S., and the address to the graduates by Rev. Percy Stickney Grant.

The number of matriculates for the session was two hundred and ninety-four.

The degree of D.D.S. was conferred on the following graduates by Professor Frank Abbott, M.D., dean of the faculty :

George N. Appleton.
Herbert R. Armstrong.
Charles F. Ash.
William G. Beecroft.
Harry M. Bartlett.
James H. Blasdell, Jr.
John M. Byers.
Walter H. Colburn.
Louis Cancino, Jr.
Thomas C. Cobb.
Percy E. Dowe.
Julius Feiner.
Benjamin Freeman.
Raoul A. Frechette.
Henry Green.
Frederick R. Goddard.
John M. Gillett, M.D.
William C. Gaerste.
Frederick J. Gottlieb.
Charles F. Halpine.
William H. Hopkins.
Marcus C. Hankinson.
Louis H. Hansen.
Joseph H. Holmes.
Oscar A. Krone.
Frank A. Kendall.
Harry O. Logue.
Abram G. Lansing.
James McKenzie, Jr.
Timothy H. Murray.
Charles E. Moore.
Vincent P. McLaughlin.
Harry P. Marshall.
Ernest W. Nickerson.
Joseph G. Pease.
Arthur L. Pearson.
William B. Powell.
Joseph Refsum.
Reuben T. Root.
James P. Ruyl.
William H. Rogers.
Joseph E. Smith.
Walter S. Smith.
A. T. Sitterley, Jr.
Edward A. Sanford.
David A. Sniffen.
Thomas F. Sweeney.
August Stubenrauch, Jr.
Samuel J. Sheckter.
Wilhelm P. Schorn.
Pedro M. Serrano.
Arthur Shorrock.
William A. Swaine.
Albert W. Twiggar.
Timothy C. Tiffany.
Frederick C. Turner.
Hubertus E. Voss.
Edgar E. Woisard.
George W. Watson.
Gerald R. Webster.
Harry A. Woodward.
William Zachman.

WESTERN DENTAL COLLEGE.

The fourth annual commencement exercises of the Western Dental College were held at the Auditorium, Kansas City, Mo., on Tuesday evening, March 6, 1894.

The annual address was delivered by Rev. C. C. Woods, the address on behalf of the faculty by Dr. Jabez N. Jackson, and the valedictory address by J. J. Moore, D.D.S.

The number of matriculates for the session was one hundred and twenty-six. The degree of D.D.S. was conferred on the following graduates by Dr. D. J. McMillen, dean of the college :

NAME.	STATE.
M. E. Bryan	Missouri.
Frank O. Boyd	Kansas.
R. M. Ball	Missouri.
E. E. Buckle	Illinois.
R. M. Bell	Missouri.
J. B. Douglas	Missouri.
E. B. Downing	Missouri.
C. P. Fyler	Kansas.
J. R. Gaines	Missouri.
E. E. Hawley	Missouri.
J. D. Houston	Nebraska.
C. I. Irwin	Missouri.
John C. Kerner	Missouri.
Harry McMillen	Missouri.
W. Magruder	Missouri.
J. J. Moore	Kansas.
H. F. Palenski	Kansas.
W. H. Pfahler	Missouri.
H. C. Rush	Kansas.
C. A. Stuerwald	Iowa.
B. C. Smith	Missouri.
H. F. Sidney	Kansas.
Lovell Shockey	Missouri.
O. E. Tibbitts	Illinois.
H. C. Thornton	Missouri.
Frank Wild	Missouri.

ATLANTA DENTAL COLLEGE.

The first annual commencement exercises of the Atlanta Dental College were held at Atlanta, Ga., on Monday evening, March 5, 1894.

The valedictory address was delivered by Mortimer Tuttle, D.D.S., and the annual oration by Mr. James W. Austin.

The number of matriculates for the session was one hundred and eighteen.

The degree of D.D.S. was conferred on the following graduates by Judge William R. Hammond, president of the board of trustees :

NAME.	STATE.	NAME.	STATE.
W. F. Austin	South Carolina.	S. M. Gunter	South Carolina.
F. R. Brinson	Georgia.	W. B. Jackson	Georgia.
T. K. Bryan	Virginia.	T. C. Jefferds	Georgia.
O. L. Branch	Georgia.	M. A. Jefferds	Georgia.
C. L. Burrows	Georgia.	S. A. King	Texas.
W. B. Cochran	Georgia.	F. G. Lieberman	Georgia.
J. L. Chapman	Texas.	B. C. Murray	Georgia.
M. D. Cowart	Georgia.	R. A. Smith	Georgia.
D. B. Caswell	Georgia.	G. G. Stallworth	Alabama.
S. B. Corn	Georgia.	G. H. Tuttle	Alabama.
J. P. Doster	Georgia.	M. H. Tuttle	Alabama.
H. A. Durant	South Carolina.	C. D. Turner	Georgia.
E. G. Gilder	Texas.	J. M. Whitehead	Georgia.

VANDERBILT UNIVERSITY—DENTAL DEPARTMENT.

The fifteenth annual commencement exercises of the Dental Department of Vanderbilt University were held in the chapel of the university, Nashville, Tenn., on Wednesday, February 28, 1894.

The charge to the class was delivered by Professor W. H. Morgan, and the valedictory upon the part of the class by A. S. Robertson, of Louisiana.

The number of matriculates for the session was one hundred and twenty-nine.

The degree of D.D.S. was conferred on the following graduates by the chancellor, J. H. Kirkland :

NAME.	STATE.	NAME.	STATE.
J. S. Betts	South Carolina.	G. T. Penny	Missouri.
A. Blomstein	Tennessee.	T. B. Ragin	Illinois.
W. W. Cross	California.	A. B. Robertson	Louisiana.
T. E. Crossley	Alabama.	W. E. Rush	Alabama.
C. E. Donnell	Missouri.	I. F. Scott	Mississippi.
Wm. W. Earhart	Tennessee.	H. M. Stryker	Illinois.
T. E. Green	Alabama.	E. F. Thames	Alabama.
S. J. Gordon	Alabama.	N. N. Vann	Alabama.
E. O. Hopps	Florida.	H. S. Vaughn	Tennessee.
A. J. Hagen	Tennessee.	Wm. W. Walker	Canada.
J. C. Haines	Illinois.	F. W. Wallace	Mississippi.
R. E. Millburne	Ohio.	D. E. Whitby	Alabama.
L. Leslie	Illinois.		

WESTERN RESERVE UNIVERSITY—DENTAL DEPARTMENT.

The annual commencement exercises of the Dental Department of the Western Reserve University were held, in conjunction with those of the Medical Department, in the Euclid-avenue Presbyterian Church, Cleveland, Ohio, February 28, 1894.

An address was delivered by Professor William H. Welch, of Johns Hopkins University, and a historical address by Dr. E. D. Burton.

The number of matriculates for the session was thirty.

The degree of D.D.S. was conferred on the following graduates by President Charles F. Thwing, D.D. : Carl A. H. Anderson, M.D., Ohio ; G. Otis D'Urfae, Ohio ; Hugh Burt Mitchell, Ohio ; and J. Frank H. Riggs, Pennsylvania.

Attention is called to the fact that the length of the term is to be extended to eight months after the next session.

MISSOURI DENTAL COLLEGE.

THE twenty-eighth annual commencement exercises of the Missouri Dental College (Dental Department of Washington University) were held at Memorial Hall, St. Louis, Mo., on Thursday evening, March 15, 1894.

The valedictory address was delivered by Dr. Henry Schwarz.

The number of matriculates for the session was ninety-four.

The degree of D.D.S. was conferred on the following graduates by W. S. Chaplin, A.M., chancellor of the university :

NAME.	STATE.
Emil F. Becker	Missouri.
Flavius O. Burket	Missouri.
Oscar Conzelman	Missouri.
George L. Finch	Illinois.
William F. Hempelman	Missouri.
Joseph B. Kimbrough	Missouri.
Robert L. Lockridge	Missouri.
William J. Lierman	Missouri.
Charles E. McIlwain	Illinois.
Joseph S. Morrison	Illinois.
Herbert W. Miles	Nebraska.
Dee Morrow	Missouri.
Clarence W. Purdy	Illinois.
Guy A. Penny	Illinois.
Malcolm Robb	Missouri.
John Tiffin	Illinois.
Everett M. Valentine	South Dakota.
Martin R. Windhorst	Missouri
George W. Wommack	Missouri.
James I. Williams	Illinois.
Richard B. Young	Missouri.

MEHARRY MEDICAL COLLEGE—DENTAL DEPARTMENT.

THE eighth annual commencement exercises of the Meharry Dental Department of Central Tennessee College were held at the Gospel Tabernacle, at Nashville, Tenn., on Thursday evening, February 8, 1894, in connection with those of the medical and pharmaceutical departments.

The address to the graduating classes was delivered by Bishop J. M. Walden, of Cincinnati.

The degree of D.D.S. was conferred on the following graduates by the president, Rev. John Braden, D.D.: M. C. Cooper, Dallas, Texas ; G. W. Miller, M.D., Nashville, Tenn. ; A. F. White, Jacksonville, Fla.

Ten dental students have been enrolled during the past session. The graduates of former years have been well received by the dental profession of the South, and are meeting with good success in their work.

DENTAL SOCIETY ANNOUNCEMENTS.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE twenty-sixth annual meeting of the above Society will be held in the Y. M. C. A. Building, Albany, on the 9th and 10th of May next. The following essays will be presented: S. H. Guilford, D.D.S., Ph.D., of Philadelphia, "Crown-and Bridge-Work, a Protest against Some of Its Abuses"; J. Allen Osmun, M.D.S., of Newark, N. J., "Can Pyorrhea be Cured?" W. J. Turner, M.D., D.D.S., of Brooklyn, "The Use of Peroxid of Sodium as Recommended by Dr. E. C. Kirk"; R. M. Sanger, D.D.S., of East Orange, N. J., "The Sixth-Year Molars."

A cordial invitation is extended to the profession.

F. T. VAN WOERT, *President*, Brooklyn, N. Y.
C. S. BUTLER, *Secretary*, Buffalo, N. Y.

The Board of Censors of the Dental Society of the State of New York will hold its annual meeting for examinations at Albany, on Wednesday, May 9, at 10 A.M. The law provides that "said society shall admit to its examinations, provided for in section eight of this act, only the following classes of persons, upon satisfactory proof of good moral character:

"First. All duly licensed and registered dentists of this state.

"Second. All persons coming from other states or countries who shall present to said society satisfactory proof of having been lawfully engaged in the practice of dentistry without the state for the term of six years.

"Third. All such persons as shall have studied dentistry for a term of four years in the office or offices of some reputable and duly licensed and registered dentist or dentists of this state, and shall have in other respects conformed to the regulations governing such examinations, which regulations not inconsistent with this act said society may make and must publish at least twice in each calendar year in a leading dental journal."

The regulations require each applicant to bring a certificate of good moral character and professional standing from the District Board of Censors of the district in which he resides.

Applicants from without the State of New York must bring such certificate signed by the president and secretary of a reputable dental society in the state from which they come.

Candidates will be examined in anatomy, physiology, histology, pathology, therapeutics, oral surgery, materia medica, chemistry, metallurgy, operative and mechanical dentistry.

NORTHERN OHIO DENTAL ASSOCIATION.

THE thirty-fifth annual meeting of the Northern Ohio Dental Association will be held at Put In Bay Island (Beebe House), on Tuesday, June 19, 1894, at 2 o'clock P.M., continuing in session three days. Members of the profession are cordially invited to be present. A number of valuable papers will be read and interesting clinical demonstrations be made.

S. B. DEWEY, *President*.
J. F. DOUGHERTY, *Cor. Secretary*

MARYLAND STATE DENTAL ASSOCIATION.

THE eleventh annual meeting of the Maryland State Dental Association will convene in Washington, D. C., April 24 and 25, 1894, in joint session with the Washington Dental Society. The dental profession is invited to be present.

W. W. DUNBRACCO, D.D.S., *Secretary*,
1023 Edmondson ave., Baltimore, Md.

NORTH CAROLINA STATE DENTAL SOCIETY.

THE twentieth annual meeting of the North Carolina State Dental Society will be held in Durham, N. C., May 6–9 inclusive, 1894. One day will be devoted to clinics. A cordial invitation is hereby extended to members of the profession in good standing.

The meeting of the State Board of Dental Examiners will be held at the same time and place.

JAMES E. WYCHE, D.D.S., *Secretary*,
Greensboro, N. C.

ILLINOIS STATE DENTAL SOCIETY.

THE thirtieth annual meeting of the Illinois State Dental Society will be held in the Senate Chamber, Springfield, Ill., May 8, 9, 10, and 11, 1894. An interesting program is in the course of preparation. Practitioners of Illinois and of adjoining states are cordially invited to attend.

LOUIS OTTOFY, *Secretary*,
1220 Masonic Temple, Chicago, Ill.

VIRGINIA STATE BOARD OF DENTAL EXAMINERS.

THE Virginia State Board of Dental Examiners will meet in the capitol at Richmond, Tuesday, April 10, 1894, to examine candidates to practice dentistry in Virginia. Only graduates of reputable dental colleges are eligible to examination.

J. HALL MOORE, *President*.
W. E. NORRIS, *Secretary*.

JOINT MEETING OF THE IOWA AND NEBRASKA STATE DENTAL SOCIETIES.

THE annual meeting of the Iowa and Nebraska State Dental Societies will be a joint meeting, held May 1 to 4, 1894, at Council Bluffs, Iowa, and Omaha, Neb.

Sessions will be held jointly. An excellent programme will be presented, and a profitable meeting may be expected.

All are cordially invited to attend, and bring appliances, specimens, or anything of interest to the profession.

W. C. DAVIS, *Secretary Nebraska Society*, Lincoln, Neb.
F. T. BREENE, *Secretary Iowa Society*, Iowa City, Iowa.

TEXAS DENTAL ASSOCIATION.

THE fourteenth annual meeting of the Texas Dental Association will be held at San Antonio, commencing on the third Tuesday in May, 1894, continuing in session four days. A cordial invitation is extended to all practitioners of dentistry to attend. CHAS. B. LEWIS, *Secretary*,
Ennis, Texas.

EDITORIAL.

DENTAL SCIENTIFIC WORK.

IN its scientific phase the growth of dentistry has not kept pace with its development as an art, probably for the simple reason that manual skill is more easily acquired than scientific culture. The disproportionate growth of dental art, as manifested in the many delicate and precise methods and manipulations which characterize it, is also no doubt largely attributable to the more material fact that the development and exercise of the art is immediately productive of financial return, while the results of scientific work are seldom or only remotely convertible into money value. This is particularly the case when scientific investigation is pursued solely for the purpose of arriving at a knowledge of abstract truth.

The ratio of development between the science and the art of dentistry is naturally in close relation to the number of workers in each department. The exigencies of practice, the necessity for maintenance, as well as lack of capacity or special training, force the majority of dental practitioners into the ranks of the routine bread-winners, in which occupation the whole of their energy and ability is expended. Whatever of effort they may apply to questions involving original research or experiment is directed toward immediate utilitarian ends, in order that their bread-winning capacity may be increased. There is, however, a proportion, small though it may be, of workers in the dental ranks who find or make the time to investigate problems in dental science which have a wider scope and broader application than the direct utilitarian. These men, imbued with the love of truth for the truth's sake, are patiently and persistently furnishing the foundation-material upon which future dental practice and teaching must rest. Of these workers for the dental weal it is frequently said that their work is done at the cost of great self-sacrifice, probably meaning that they are not remunerated in cash for their services rendered; but such work is a labor of love which brings its full compensation in the results achieved, and it in no sense involves self-sacrifice. But a few years ago dentistry had no scientific basis. It was a mere handicraft, which, from the point of view of its present development, was a rude one. The results of scientific investigation in dental histology, pathology, materia medica, therapeutics, chemistry, and hygiene have completely revolutionized the practice, and modern dentistry is what it is to-day because of the leaven of scientific workers in its ranks who have developed it from its crude beginnings. Too often the criticism is made by the so-called and generally self-styled "practical" man that this scientific work in dentistry is no doubt all very interesting to those who like it, but there is nothing in it for the busy dentist to put to actual use in his every-day practice. Such criticisms arise from ignorance of the facts, or a very narrow view of them, and need no further refutation than reference to the scientific reasoning and research in bacteriology which gave to the world the practical procedures of antiseptic surgery, or the elaborate theoretical chemical reasoning which developed, besides the entire series of coal-tar colors, nearly a whole materia medica of synthetic drugs and therapeutic agents. In dentistry itself whatever of certainty and exactitude appertains to therapeusis, or of precision and successful adaptation has been achieved in dental prosthesis, may be safely credited to the scientific investigation in the departments of chemistry, physiology, bacteriology, pathology, physics, metallurgy, and mechanics which has contributed to the perfection of our methods.

What we need, then, in dentistry is not more of the so-called practical, by which is meant the strictly empirical, but more of the essentially scientific, which is the only truly practical; less of mysticism and rule of thumb, and more of the rational and the exact.

Reports of dental discussions, periodical dental literature, and dental standard works are replete with statements and arguments based upon mere speculation, with no foundation of fact beyond that constructed in the brain of the originator. Only comparatively rarely are reports or statements made which are founded upon original research or experiment, or even upon accurately observed individual phenomena. When it is considered that only such matter can possess any scientific importance or lasting value, it must be evident that we are wasting time and energy in giving it attention.

It is not given to all men to be scientific investigators in the broad sense, but it is, after all, largely a question of degree, for every one is, or should be, capable of observation, and the ability to correctly interpret and report the result of such observation is simply a question of practice and training.

To properly observe and interpret selected phenomena is the initial step in scientific investigation, and it is the ability to correctly reason and generalize upon the results so obtained which constitutes the scientific method of thought. It cannot be successfully gainsaid that whatever of substantial progress has been made in dentistry has been achieved through applications of the scientific method to the study of its phenomena, due regard being had for what in reality constitutes the scientific method. The period of its growth in which empiricism and reasoning of the phrenological order held exclusive sway in dentistry has passed by, and henceforth a due respect for the uncompromising requirements of scientific exactitude must govern its procedure, rather than faith in the *ipse dixit* of self-constituted authorities or in the plausible claims of the nostrum-vender.

The growth of the scientific method in dentistry presents a geographical phase which cannot be ignored or set aside. Whatever claims to precedence we may make with respect to the development of American dentistry as an art,—and they are, no doubt, true in the main,—no one who even superficially observes the matter can fail to see that our transatlantic *confrères* produce an aggregate of scientific work in dentistry which far exceeds the output in this country in the same lines. The scientific method of thought and its application to original research is the predominating characteristic not only of continental dental writers, but of those of Great Britain as well. We are too prone, in our anxiety to utilize the practical results of their plodding and laborious investigations, to ignore the steps by which the results were achieved, an intelligent understanding of which is generally necessary to its successful application. It behooves us, then, to cultivate an appreciation of the value of this class of work, and to train ourselves and our students into a familiarity with scientific methods, in so far, at least, as they apply to dentistry, not only that our present standards shall be improved, but that American dentistry shall not present the distortion of a one-sided growth. The next system of dentistry, when it shall be written, will not be exclusively the American system, for the field has become so enlarged, and the scientific work of the dental profession outside of America has been of such importance, that geographical limitations will find no place in such a system if it is to be fully representative of the subject. It will be an international system of dentistry, and we should see to it that in such an event, or in any case, the American quota of work does not suffer by comparison with the scientific dental progress of Europe.

The application of the laboratory method in dental education, the introduction of the technic method in our schools, by bringing the instruction in operative and mechanical dentistry and therapeutics into line with the laboratory method as utilized in the departments of pathology, chemistry, and histology, is a most important step toward cultivating a scientific habit of mind and a desire for original research among the dental students of to-day, which must tend to elevate our standards and ideals, and react favorably upon future methods of practice. It is equally important that those already in active practice should cultivate the same tendencies, not only for individual benefit, but for the good of the profession. Each man owes it to his calling to devote at least a fair proportion of his ability to the advancement of that calling, and it cannot be better done than by the pursuit of some line of research which shall translate something of the unknown into terms of the known, and publishing the result broadcast for the benefit of his colleagues.

PROFESSOR W. D. MILLER.

We have learned through Dr. R. H. Hofheinz, of Berlin, that Dr. W. D. Miller has recently had conferred upon him by the University of Berlin the additional honor of appointment as "Extraordinary Professor of Medicine," an honor rarely bestowed upon foreigners, and not previously held by any professor of dentistry in Germany. This announcement will be a source of gratification to the friends of Dr. Miller, not only because it is a fitting recognition of his scientific ability, but as dentists we must take a just pride in the distinction which is thus conferred upon so worthy a member of our calling.

TRANSACTIONS OF THE WORLD'S COLUMBIAN DENTAL CONGRESS.

The Transactions are now nearly ready for the final proof-reading. It is therefore very desirable that those who want extra copies, and those who would like to subscribe for them, should do so at once, as it is the intention of the committee of publication to print only a sufficient number of copies to supply the members of the Congress and those who have subscribed for them. The subscription price is $10.00. Subscriptions should be sent to Dr. John S. Marshall, treasurer, No. 1003 Venetian Building, Chicago, Ill.

BIBLIOGRAPHICAL.

The Discovery of Modern Anesthesia. By Whom it was Made. A Brief Statement of Facts. By Dr. Laird W. Nevius, Specialist, etc.

This is the title of a small work of some hundred pages, illustrated by several portraits. Of these (for some reason not easily discoverable), that of the author is used as a frontispiece. New books are generally expected to throw fresh light upon a subject or demonstrate some new truth. Aside from a few meager biographies being bound in one volume, this work can scarcely be said to afford any new or exact knowledge pertaining to the discovery of artificial anesthesia. With the exception of one or two anecdotes, the accuracy of which it would to-day be difficult to prove, there are but few statements not contained in any previous book upon the same subject. There appears to be a disposition here to credit the claims of Dr. Long more than those of Horace Wells. Again, while stating definitely that Dr. Jackson suggested sulfuric ether as a fit agent for the production of surgical anesthesia, more weight is given to the work of Morton than of Jackson,—Jackson, apparently, in this instance, as the book reads, being the scientist, while Morton grasped the commercial aspect of the suggestion.

It is rather a late date to determine the precise amount of honor we are to accord to each discoverer. It is a fair inference that the Congress of the United States and several scientific societies had accurate data laid before them, and they acted upon fresh information, and, if all reports be true, a clamorous offering of testimony was made.

As far as new evidence is concerned, it is at present at least inexact, and, if any fresh distribution of honors is to be made, it will be only after more positive testimony is offered than has yet been.

The whole controversy, from 1847 to the present time, has been no more marked by acrimony than it has been by a disposition to laud those who applied the scientific discoveries more than the original suggestors of the agents to be employed.

Catching's Compendium of Practical Dentistry for 1893.

Catching's Compendium, of which the present volume is the fourth annual issue, is a work which places the dental profession under obligation to its compiler for the labor and intelligent care which he has bestowed upon it. It presents a fairly complete *résumé* of the best that has been done in dentistry during the year, and furnishes the matter in a form which is convenient and easily accessible for reference.

We have favorably noticed each issue as it has appeared, and heartily commend the present volume as in several particulars surpassing its predecessors. Not only does it contain a larger amount of matter, but it is more conveniently classified by subjects. A notable improvement is the enlargement of the scope of the work by including the progress of dentistry in France, Spain, Germany, and Italy, in which countries the record is made by Drs. Hugenschmidt, Da Silva, Miller, and Dunn, respectively. The international feature of the work is to be still further emphasized in the next issue by including abstracts from all the foreign dental periodicals. Dr. Catching deserves the approbation and support of the entire profession in this undertaking. The Compendium is published and sold by B. H. Catching, D.D.S., Atlanta, Ga. Price, $2.50 to annual and permanent subscribers ; $3.00 to non-subscribers. Postage free in the postal union.

OBITUARY.

DR. ROBERT REYNOLDS HEYWOOD.

Died, at his late residence, No. 18 West Ninety-third street, New York city, February 13, 1894, of pneumonia and hypertrophy and dilatation of the heart, Robert Reynolds Heywood, D.D.S., in the fifty-first year of his age.

Dr. Heywood's last illness was of but four days' duration, though he had been physically weak for several months, and even for years had not been a strong man. He studied dentistry in the office of a practitioner of Hartford, Conn., after which he practiced for several years in the country, Catskill, N. Y., being his last place of residence before going to New York City, which he did with the purpose of seeking a wider field and better advantages for his talents. After establishing himself in New York, he matriculated at the New York College of Dentistry, and received his diploma from that institution in March, 1873.

Dr. Heywood made rapid advancement in his profession, becoming a most skillful operator, until he had few rivals in the successful treatment of the most difficult cases known to dental surgery. His lack of physical vigor somewhat interfered with his practice, and necessitated his twice going abroad for the benefit of his health. He at one time contemplated establishing himself in Paris, but his preference for his own country brought him back to New York. He was retiring and domestic in his habits, preferring his own home rather than society or professional publicity. He was not only skillful, but gentle and sympathetic in his practice, having the confidence and trust of his patients to a remarkable degree, and his loss is deeply felt by a large circle, many of whom are prominent in social and business life in and about New York. He was a Christian from his boyhood, pure in heart, and upright in his intercourse with his fellow-men. He was married in 1870 to Sarah Louise Heywood, who, with one son, survives him.

[It should be explained that Dr. Heywood's name was originally Robert M. Reynolds, but that, in 1886, in compliance with the wishes of his late father-in-law, he legally assumed the name of Robert Reynolds Heywood.]

DR. WORTHINGTON PINNEY.

Died, at the home of his uncle, in Muitzeskill, Rensselaer county, N. Y., February 22, 1894, of paresis, Worthington Pinney, D.D.S., in the fifty-second year of his age.

Dr. Pinney was for many years a well-known and intelligent practitioner of dentistry in Newark, N. J. He was born in the state of New York. He graduated at the Baltimore College of Dental Surgery, class of 1886. His remains were interred at Muitzeskill.

At a meeting of the American Academy of Dental Surgery of New Jersey, held March 12, 1894, at the office of Dr. Holbrook, in Newark, the following resolutions were adopted:

Whereas, The death of Worthington Pinney, D.D.S., a fellow of this academy, removes from our society and the profession one who was ever zealous for its best interests, and who, while health permitted, was ever active and earnest for the good of the academy and his chosen calling; therefore be it

Resolved, That on this occasion we deem it appropriate to express our sorrow at his removal, which we deem a loss not only to ourselves, but to the profession at large; and we hereby express our appreciation of his many excellent qualities, both as a man and as a dentist, in professional and social life, and our sympathies are hereby extended to his sorrowing relatives and friends.

[Signed by C. W. F. Holbrook and Charles A. Meeker, committee.]

DR. HENRY SNOWDEN.

DIED, in Baltimore, Md., January 16, 1894, Dr. HENRY SNOWDEN, in the seventy-fourth year of his age.

This well-known member of the firm of Snowden & Cowman, dealers in dental supplies in Baltimore, and publishers of that pioneer in dental journalism, the *American Journal of Dental Science*, was born at Laurel, Md., September 29, 1820. He was educated at a boarding-school at Alexandria, Va. He early exhibited a fondness for mechanics, and after serving several years in machine-shops at Laurel, went to Baltimore, and was instrumental in establishing a large cotton-duck and cotton-lap factory at Canton, a suburb of that city. This plant having been destroyed by fire, about the year 1852 Dr. Snowden turned his attention to dentistry, and became a student in the office of Dr. Joseph J. Stewart. He subsequently opened an office in Baltimore, where he practiced dentistry in all its branches, becoming very proficient, especially in platinum work. In 1856 he gave up practice and opened a depot for the sale of dental materials, which he conducted up to 1860, when he associated with him as partner his brother-in-law, Mr. Charles H. Cowman, and from that date to the present the well-known firm of Snowden & Cowman has existed. During his career Dr. Snowden made numerous inventions in the line of dental lathes, chairs, instruments, etc., as well as hydraulic apparatus for freight and passenger elevators.

Dr. Snowden was first married, in 1847, to Miss Mary E. Cowman, of Alexandria, Va., who died in 1869, leaving no children; secondly, in 1878, to Miss M. Victoria Birkey, of Baltimore, who survives him with one son. He was a practical Christian philanthropist, successively a member of the Methodist and Episcopal churches, as also of several philanthropic institutions, which will greatly miss his aid and counsel. His funeral was largely attended.

DR. GEORGE B. PAYSON.

DIED, at the home of his brother, in Wilkes-Barre, Pa., February 28, 1894, of consumption, GEORGE B. PAYSON, D.D.S.

Dr. Payson was a graduate of the Philadelphia Dental College, class of 1888, and was a bright and capable young dentist. After graduation, he opened an office in Le Raysville, Pa., where he had spent most of his life. He subsequently went to Newark Valley, N. Y., and practiced there about two years; but failing health caused him to remove to Freeland, Pa., on the mountain below Wilkes-Barre, with the hope of benefit. This was not realized, and about eight months ago, by the advice of his physician, he went to Colorado, with much expectation that that climate would restore him. Again he was disappointed, and returned only to succumb, on the date above given, to the disease which had been sapping his life.

Dr. Payson married Miss Kittie Bailey, whose death occurred about ten months previous to his own, while they were sojourning at Freeland. His remains were taken to Newark Valley, and laid to rest beside those of his wife. A three-year-old daughter survives them. Dr. Payson was held in high esteem by all who knew him.

PERISCOPE.

Sulfuric Acid for Opening Root-Canals.—The opening of "root-canals" has been the subject of much discussion and many wild assertions. We have often heard of dentists who claimed to be able to open to the apex, the root-canal or canals in any tooth.

I wish to say that no such claim will be made for the method that I desire to bring before you to-day. For the opening or enlarging of all straight and unobstructed canals, I prefer and use the "Gates-Glidden" drill after the manner described by Dr. George Evans, in his work on "Artificial Crown- and Bridge-Work," third edition, page 21; but, valuable as this instrument may be, we see almost every day, in practice, canals that cannot be opened properly by this or any other drill.

It is seldom that we see canals in buccal roots of superior molars, or in roots of lower molars, in which a drill can be used; many times in bicuspids and inferior incisors the roots are so flat and thin that drilling is dangerous, yet all these canals may be in such condition that we are compelled to open them for treatment and filling. There are canals that are constricted just at the chamber, sometimes so much so that they can scarcely be found, yet the canal in the root is large and should be opened. There are canals in curved roots and canals obstructed by osseous growths, that, if not properly opened, would most likely cause trouble. It is with this difficult class of root-canals that I wish to deal at this time.

It has been about four years since I began to open this difficult class of canals by using a twenty to fifty per cent. aqueous solution of sulfuric acid and the Donaldson root-canal cleanser. To illustrate the method, let us suppose we have a superior molar, from which the pulp-tissue has been removed. The palatal root being large, can be prepared by any method you may choose; but let us say the canals in the buccal roots cannot be found, we would then place a pledget of cotton saturated with the acid solution in that portion of the cavity near the buccal roots, and seal it in the tooth for twenty-four or forty-eight hours; then upon the removal of the stopping, wash out the cavity with a dash of water from the syringe; upon drying the cavity you will find it white and clean, with two dark spots in the vicinity of the buccal roots, showing where the canals can be found. Now we try to enter the canal with the nerve-bristle; we find no opening. To make sure we are not being deceived by a constriction, we take a bud drill and follow these stains a short distance; if we find no opening, or a very minute opening too small for the bristle, we will feel justified in saying they need no further treatment. But if with our exploring instrument we find a canal, we will carry the acid to the canal by dipping the instrument in the solution, or by means of the pliers, or better still, the latest pattern of the Dunn syringe, made of glass and rubber with platinum or gold point, place a drop of the agent in the chamber, and with a No. 5 Donaldson canal-cleanser pump the acid into the canal; the acid will soften the walls of the canal sufficient to allow the broach to cut its way into the root; the acid will also thoroughly sterilize the canal and everything in it. No germ or spore can live in the presence of H_2SO_4 in the strength mentioned. The broach may scarcely enter the canal at first, but if you are persistent it will be but a few minutes till the instrument will go quite a distance into the canal until you reach the end of the root, where a much stronger resistance will be met with.

The thickened cementum at this point seeming to offer a greater resistance to the agents used, the canal can then be enlarged by using larger broaches, or, if the root is straight, the "Gates-Glidden" drill will follow the canal just made. It is more than likely that the apical foramen has not yet been opened;

this can be accomplished, if desired, by drilling or by placing a small thread of cotton saturated with the acid solution in the end of the root and leaving it there over night, and then using the broach and acid at next sitting; after one or two trials you can readily see how crooked or obstructed canals may be opened in a few minutes, and the canal will be in condition for immediate root-filling. It must be borne in mind that the rubber-dam should always be in place before the operation is begun; the adjoining teeth may be protected by placing the dam on none but the tooth being operated upon.

I confess that at first sight the application of so strong a solution as fifty per cent. looks to be rather heroic; but four years' constant use has proven to me that there is little or no danger of injuring the tooth or the surrounding tissue, if the operation be controlled by any sort of common sense. We do not hesitate to use arsenic or nux vomica, aconite, argenti nitras, cocain, and scores of other poisonous drugs. We can have the action of the acid under perfect control. I always keep a saturated solution of bicarbonate soda on my case, so that I may stop the action of the acid at any moment. In but few cases is it probable that the acid will go through the apical foramen in quantities or strength sufficient to have any corrosive effect, for the reason that neutralizing agents in the dentine will have materially weakened the acid before it can pass through the extremely small opening at the apex of the root If there be an abscess present, the foramen is likely to be larger, and the condition of the tissues about the apex of the root will be materially benefited by the presence of the acid even if in the full strength of the solution. In my mind there could be no better agent for the breaking down of the diseased tissues and the positive destruction of all germ life. A case in practice will probably illustrate the point I wish to develop: A lady about twenty-five or thirty years of age, who had been under surgical treatment for a large fistula at the symphysis of the chin, came to me at the request of the surgeon for examination and treatment, if I thought the case demanded it. By the aid of the electric light I was enabled to locate the trouble in the two inferior central incisors; the pulp-chambers in both teeth were opened; the canal in each tooth was so small that they were practically closed; a drop of the acid solution was placed in the pulp-chambers, and, with a No. 5 Donaldson root-canal cleanser, was pumped into the canals; in a few minutes the instrument found its way through the root. The canals were then enlarged by using larger broaches, thereby establishing direct communication from the pulp-chamber through the seat of the abscess and through the whole length of the fistula. Several drops of the solution was then pumped through the roots into the fistula and made its escape through the opening at the symphysis. On the second day the case was given the usual antiseptic dressing; on the fourth day the roots and fistula were thoroughly filled with chloro-percha. The case was kept under observation for a few days, when, no signs of inflammation appearing, the case was dismissed as cured. This is one of a number of cases successfully treated in this manner; in this case I do not believe the roots could have been opened in a reasonable time by any other method, and I believe that the acid solution was the best remedial agent that could have been applied at that stage of the treatment. The acid at first attacks the tooth-substance vigorously, breaking up the lime-salts and corroding or changing the form of the organic substance and forming a new compound, thereby establishing a barrier to the farther progress of the acid. Prof. J. S. Cassidy in his valuable text-book, "Dental Chemistry and Materia Medica," page 77, says, "The acid attacks the earthy portion, forming insoluble calcium sulfate ($CaSO_4$), and at the same time dehydrating the animal or gelatinous portion, which is mainly made up of carbon, hydrogen, and oxygen; these latter two elements are withdrawn as already alluded to, leaving the indestructible carbon as a residue, to be incorporated with the insoluble sulfate, producing thus a protecting covering to the unaffected parts beneath against further inroads both of the causing agent and other solvents."

I have here several specimens which I hope you will examine carefully. As you see, large cavities were cut in sound teeth. The cavity in No. 1 was kept full of a fifty per cent. (by volume) solution of sulfuric acid for ten minutes. The cavity in No. 2 was kept full of the same solution for two hours. The cavity in No. 3 was kept full of the same solution for twenty-four hours. The cavity in No. 4 was subjected to no other treatment than to be washed with alcohol. The cavity in No. 5 was filled with the same solution on December 1, at 1 P.M., and kept full till the morning of December 5, when I placed a pledget of cotton saturated with the solution in the cavity and sealed it in the tooth with wax; this was done that I might bring the tooth to you that you may open and examine for yourselves. In No. 5 the root-canals were opened as described by the use of the acid and broaches, and the ends of the roots were then ground off to show the action of the acid on the walls of the root-canal near the apex. No. 6 received no treatment further than to have the ends of the roots ground off the same as No. 5, in order to show the normal appearance of root-canal near apex. I think you will be unable to discover any material difference in the appearance of the dentine in Nos. 1, 2, and 3, which I think is proof that the action of sulfuric acid on tooth-substance is self-limited; for we find in this experiment that the acid penetrated the tooth-substance practically no farther in twenty-four hours than it did in ten minutes. If, with an excavator, the almost invisible layer of dissolved dentine be removed, a perfectly hard smooth surface will be found. About the root-canals specimen (No. 5) you will see what appears to be a small zone of decalcified dentine. A glance at specimen No. 6 will show the same appearance. As to the action of the acid solution on the bone-tissue surrounding the roots of the teeth, I quote Mr. George Pollock, F.R.C.S., Surgeon to St. George's Hospital, who says, "Dilute sulfuric acid does not affect the living, acting chemically on diseased bone alone," and gives the following experiments: Portions of dead, diseased, and healthy bone were selected and subjected to the action of "sulfuric acid," viz:

No. 1.	Dead bone	10 grains.
" 2.	Diseased bone	" "
" 3.	Healthy bone (middle age)	" "
" 4.	Healthy bone (old age)	" "

Exposed to the action of a mixture of sulfuric acid and water, one part in four for three days, at a temperature of 100°, the following were the results:

No. 1. Dead bone; phosphate of lime, 2 grs.; carbonate of lime, 3.3 grs. dissolved in the mixture.

No. 2. Diseased bone; phosphate of lime, 2 grs.; carbonate of lime, 1.3 grs. dissolved in the mixture.

Nos. 3 and 4. In both specimens of healthy bone, *no action took place*.

Prof. Garretson says, in his treatment of "caries of the maxilla," he used the official ordinary "sulfuric acid." (Garretson's Oral Surgery, third edition, pages 705 and 706.)

On the soft tissues the solution will have a corrosive and astringent effect; or, in other words, will break down or destroy the diseased tissue, leaving a fresh, clear field for nature to take care of herself with the assistance of milder antiseptic treatment.—*J. R. Callahan, D.D.S.; read before the Ohio State Dental Society.*

LATE ERUPTION OF A CARIOUS CUSPID.—Dr. Weil gives, in a German contemporary, an account of the eruption, associated with caries, of an upper cuspid in a patient over sixty years of age When seen four years previously there were five teeth standing in the upper jaw, the others having been lost by alveolar absorption. The right cuspid was apparently missing, as the first bicuspid was in close juxtaposition to the lateral incisor. These two teeth were loose, and inclined forward in a labial direction. The bicuspid was removed with the fingers and artificial teeth were constructed. In a few months, however, a palatal swelling appeared behind the lateral, and the denture was discarded on account of the pain produced by wearing it. After some months the swelling had become larger and the patient complained of increasing tenderness, a sense of fullness, and throbbing pain,—in short, all the symptoms of periodontitis. This condition continued with more or less severity for about two years, when the tip of the tooth erupted in the palate. By examination it was ascertained that the erupting tooth, which was evidently the missing cuspid, lay in an oblique direction, and was so turned on its long axis that the labial surface was directed downwards into the mouth and the lingual faced the palatal process of the maxilla; further, a large carious cavity was found on the lingual surface, which was still covered by gum-tissue, and a probe readily entered the pulp-chamber, giving exit to some pus. The tooth, when extracted, was found to be a cuspid of ordinary appearance, and had no resemblance to a supernumerary tooth. The most remarkable point in this case, said Dr. Weil, was the large cavity of decay, with the consecutive periostitis.—*Lancet.*

Death under Chloroform.—We are indebted to Dr. George Heaton for the following account of death during chloroform-anesthesia: A. B., aged eleven, a boy, to all appearances strong and sound, was anesthetised on December 19 last for the removal of several carious molars. Some strong soup was given him three hours before the operation. The anesthetic—a mixture of three parts of chloroform and one of ether—was administered on folded lint, and the patient inhaled it without any struggling or retching. When he was ready for the operation the lint was removed, and no more given at all. The teeth were successfully extracted, there was very little bleeding, and the patient's condition, both during the operation and for some minutes afterward, was excellent. About four or five minutes after the completion of the operation, or some eight or nine minutes after the administration had been stopped, the pulse at the wrist, which had until then been full and strong, suddenly ceased. There was no retching or vomiting, no pallor of the face, and the respiration continued full and deep for several minutes after all pulsation at the wrist had ceased. The pupils dilated widely at the moment the pulse stopped. The patient was inverted; artificial respiration was tried for fifty minutes. Ether was injected subcutaneously, and nitrite of amyl applied to the nostrils, but the heart was never felt to beat again. A *post-mortem* examination showed the right cavities of the heart full of fluid blood, the left contracted and healthy. There was a slight excess of fat on the heart's surface, but otherwise the organ was perfectly healthy; the stomach was healthy. Duncan and Flockhart's pure chloroform was used, mixed with a fourth part of its bulk of ether. Four and a half drachms of the mixture in all were used from the graduated drop bottle.—*British Med. Journ.*

HINTS, QUERIES, AND COMMENTS.

Reaction of Hydrogen-Dioxid Solutions.—Messrs. McKesson & Robbins have called our attention to an interesting and important fact in relation to the mode of testing the reaction of their pyrozone preparations. Blue litmus-paper, when moistened with any of the pyrozone preparations, is promptly reddened,—a reaction which, under all other observed conditions, indicates the presence of free acid in the substance. Hydrogen dioxid, however, is an exception to this rule, for even its solutions, made strongly alkaline with ammonic hydrate, will still redden blue litmus-paper. The property of reddening blue litmus is, therefore, a characteristic of hydrogen dioxid, as well as of acids. In order to ascertain the reaction of a given sample of hydrogen dioxid in solution, recourse must be had to the aniline-test solutions of the new U. S. Pharmacopœia. The methyl-orange test solution, U. S. P., is used for determining the presence of acids, and the phenolphtalein test solution, U. S. P., for detecting alkalinity. The action of these tests is not obscured or interfered with by any specific effect of the hydrogen dioxid, and may be relied on to show the reaction of its solutions, a fact of considerable importance when it is proposed to utilize these preparations in contact with enamel. The alkaline quality of any solution of pyrozone, aqueous or ethereal, may be procured by conveying on a glass stirring-rod two drops of water of ammonia, specific gravity 0.959, to any quantity less than an ounce required for immediate use.

"WHY DO VULCANITE UPPER PLATES CRACK?"—In the March number of the DENTAL COSMOS is an article taken from the *Dominion Dental Journal*, with the foregoing heading, together with eight answers, most of which are far from the truth. It is not presumed, however, that the writer was serious in giving them.

Whether these plates are "worth a cent" or not, the fact remains that thousands of them are being made, and that many of them are coming back to their makers for repairs,—"cracked" through the middle. The cause lies in this fact: After the plate has been made, the alveolar process continues to be absorbed, while the hard palate remains intact. In this condition, pressure on the teeth bends the plate through the middle from front to rear, eventually splitting it. Let the patient press the jaws together; the centrals will separate, showing plainly where the trouble lies. It is important to remember that it is not worth while to mend a plate thus injured. It will certainly "crack" again; the cause has not been removed. Make a new plate. It is cheaper for the patient and better for the reputation of the dentist.—A. G. MINGLEDORFF, Savannah, Ga.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—I inclose drawings of a little device which occurred to me as a combination of other men's ideas, and which I have found useful to rotate the incisors by a "practical" method. It is, as may be readily seen, a combination of the Elliott separator and the Lee pull-back. I would also call attention to the fact that the jack-screw will fit the screw-post of the Lee pull-back, and is just as positive and better in many cases than the Lee-Bennett, as it is smaller and will go into smaller places.

FIG. 1.

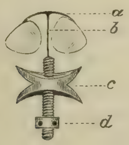


FIG. 2.

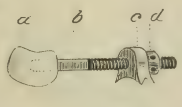
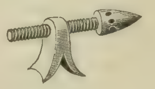


FIG. 3.



Figs. 1 and 2—*a*, thin plate of metal to rest on face of teeth to be rotated; *b*, thin spring steel to pass between the teeth; *c*, loose post to vulcanize in plate; *d*, nut to draw the device backward.

Fig. 3, jack-screw device.—WM. H. MITCHELL, D.D.S., Bayonne, N. J.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Some weeks ago, while trying to manage a difficult case of pyorrhea alveolaris, I was seriously bothered in the removal of the deposits, in fact was about to give it up, when I was inspired with the thought that the mallet and chisel might help me out of the scrape, and upon trial found very satisfactory results. In thinking the matter over later, I became convinced that the Bonwill mallet was just the thing for the purpose. After a trial I am thoroughly converted to the belief that this instrument, or one of the same principle, is the proper thing to remove these deposits, inasmuch as with a narrow chisel scaler you can chip off all the calcified matter on the roots without encroaching upon the peridental membrane or alveoli. This is in accord with my theory that these parts should not be disturbed. The results have proven so satisfactory that I cannot refrain from writing you, that the profession at large may profit by the same. I beg as well to add the formula for a lotion which has given me the most pleasing results in the treatment of this disease:

℞—Lysol, f℥ ij;
Tinct. capsicum, gtt. xv;
Tinct. iodin, fʒ i.

Sig.—Five drops in one-half glass of water used as a wash, in cleansing the teeth with a brush.—F. T. VAN WOERT, M.D.S., Brooklyn, N. Y.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—I cannot report further on trichloracetic acid, as I had hoped to do, except to say that I have had more than fair success in its use for obtunding hypersensitiveness at the necks of teeth, principally the incisors; usually the second application of the ten per cent. solution is sufficient. The only failure I have to record is in a case where the acid reaction of the mouth was very strong. This fact I overlooked, and applied the trichloracetic acid. Next day the lady returned, saying the pain was much worse, and simply unbearable. An alkali was at once suggested, and the only thing at hand was what is called Robinson's Remedy, which I applied. In four days the lady reported the sensitiveness gone and comfort restored. She can now brush her teeth about the labio-cervical margins, something she has not been able to do in two years.

This is a hint to the "hobbyist," for it proves that we cannot rely on one remedy in all cases.

I am specially pleased to report, so far as my experience goes, that we have in trichloracetic acid an unequaled remedy for aphthous stomatitis or canker sore mouth. These mucous patches are often quite painful, and annoying to both patient and operator. Ordinarily, one or two applications will be sufficient. In extensive cases, patients may be given a small bottle and apply it for themselves. It seems to me that we can do the medical profession no better service than to call their attention to this remedy as a "specific" in this class of lesions. One application is sufficient to stop further progress, if used on first appearance of the lesion. I say this with considerable confidence, because I have succeeded where the physician has failed.

J. AUSTIN DUNN, Chicago, Ill.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING FEBRUARY, 1894.

February 6.—No. 514,073, to FRANK K. HESSE. Angle attachment for dental hand-pieces.
" " No. 514,074, to FRANK K. HESSE. Angle attachment for dental hand-pieces.
" " No. 514,201, to LUCIUS ROBERTSON. Mechanical dentistry.
" " No. 514,289, to JOSEPH M. STROUT. Dental clamp.
" " No. 23,038, to CHARLES L. WAGANDT. Design for tooth-brush holder.
February 13.—No. 514,628, to WALTER SMITHHARD. Apparatus for administering nitrous-oxid gas.
" " No. 514,882, to WALTER S. ELLIOTT. Dental mandrel.
February 20.—No. 514,941, to FREDERICK A. KOTTS. Dental tool.
" " No. 515,126, to FRANK M. MCCARTY. Dental engine mallet.
February 27.—No. 515,400, to HARDY B. HARRELL. Artificial tooth.
" " No. 515,488, to CONSTANT DORIOT. Electric motor.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a Thesis.

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ORIGINAL COMMUNICATIONS.

THE MISSING TEETH OF MAN.

BY ALTON H. THOMPSON, D.D.S., TOPEKA, KANSAS.

(Read before the twenty-seventh annual meeting of the Tennessee Dental Association, at Nashville, Tenn., March 28, 1894.)

IF I may be indulged in a personal reminiscence as an introduction to this paper, I would say that the presentation of this subject in this city is fraught with a peculiar interest, owing to the fact that the theme of the paper was first called to my attention by an address given in the city of Nashville by Professor O. C. Marsh, before the meeting of the American Association for the Advancement of Science, in 1877, upon the subject of "The Introduction and Succession of Vertebrate Life in America." In the course of that most delightful and instructive paper, he says, "In the Lower Eocene strata of New Mexico we find a few representatives of the lowest known primates, and among them the genera Lemuravus and Limnotherium, each the type of a distinct family. These are very abundant in the Middle Eocene of the West. Lemuravus appears to have been most nearly allied to the lemurs, and is the most generalized form of primates yet discovered. It had forty-four teeth,—forming a continuous series above and below. Limnotherium is also related to the lemurs, but shows some affinities with the South American marmosets."

As forty-four is the archetypal number of mammalian teeth, and these lowest forms of the quadrumana having the full number, besides being very much generalized in other respects, the fact of these low forms (which were the probable ancestors of all the quadrumana and of man) being found on American soil was one of peculiar interest. These forms were much generalized in all their anatomy, and exhibit relationship with many later, higher, and more specialized families. The teeth, for instance, were a continuous series, graded gradually from incisors to cuspids, from cuspids to premolars, and from premolars to molars. In the higher primates some of these teeth have been lost, so that the continuity of the series is broken. In man, for instance, there are abrupt changes from one series to another.

The article of Professor Marsh suggested, and subsequent studies aided, the solution of the problem as to the probable cause and origin of the extra teeth that sometimes appear in man, and are known in the text-books as "supernumeraries." They are generally considered "freaks," like extra fingers or toes in polydactylism. To the evolutionist, however, these extra teeth are invested with peculiar interest. They are conspicuous examples of the workings of the wonderful law of *atavism*,—*i.e.*, the reappearance of lost organs or parts that have, in the course of development, been aborted. The plain fact is that man has, in the process of his evolution from the lowest typal mammal, lost twelve teeth,—*i.e.*, the difference between thirty-two and forty-four, the typical mammalian number. Supernumerary teeth are the representatives of those teeth that have been lost, are the reappearance of the lost teeth. It seems that nature, in response to some undiscovered impulse, makes a spasmodic effort, a spurt of hereditary energy, and reproduces some of the other twelve original dental germs. Fourth molars, third bicuspids, and third incisors, which were the teeth that have disappeared from the species, are the ones that are reproduced as extras or supernumeraries. They are, of course, usually deformed and rudimentary, as if the effort to produce teeth of full form were too much for the failing powers. Occasionally a fully formed and typical tooth is produced, but this is rare. They are usually quite rudimentary. Man has lost one incisor, one premolar or bicuspid, and one molar, from each side of each jaw, which are the teeth reproduced and called supernumeraries.

As Mr. Osborn says, in the *American Naturalist* (1892, p. 467), "That upon the descent theory, the reduction of the teeth in the progenitors of man began as far back as the Eocene period, for not later than that remote age do we find the complement of three incisors and four premolars on each side of each jaw. Now there are but two remaining of each in man." The fourth premolar, to which Mr. Osborn refers, is, however, a true molar, and belongs to that series. He continues, "Not infrequently the missing incisor occurs by reversion. An embryonic third incisor has been found in the jaw also. In 1868, Sedgwick reported a case of six upper and six lower incisors in each jaw, appearing in both first and second dentures. This anomaly was inherited from a grandparent,—a striking evidence of hereditary reversal tendency. Wilde has shown that the last incisor reappears more frequently in the upper than in the lower jaw, coinciding with the fact that the lower teeth were the first to disappear in the race. He thinks that the lost incisor tooth was the one next to the canine. Baume believes that the missing tooth was the median one, but this is not likely."

From our clinical experience, we have observed that the supernumerary incisor, wherever it appears, whether in the arch or inside or outside of it, is rarely of true incisor form, but nearly always of caniniform shape (Fig. 1), showing that it is related to the cuspid and belonged next to it in the series,—that is, when the teeth were all in place and were graded from one to another in regular continuity of form. The missing incisor, the third, when in place in the primitive mammalian dentition of forty-four teeth, came next to the lateral, and graded from it to the cuspid. It therefore must have been more of a cuspid than a lateral, and this is borne out by the form it usually assumes when it reappears in man. But the resemblances would be most interesting to work out from an assortment of supernumerary incisors, compared with the third incisor of the typical mammal in the fossil skull. In man it very rarely appears as a true incisor (Fig. 2), but more often as a partial incisor, or a caniniform crown, or a mere peg, or a nondescript rudiment.

As is well known, the present lateral, the second incisor, is very erratic, and follows the third molar in the frequency of its irregularity, both as to form and number. It is quite erratic in form, often being a mere peg, and is of various degrees of perfection. It is often absent from the denture entirely, and one or both may be missing and for several generations in a family. Like the third molar, it seems to be on the road to total suppression. The lateral is itself graded in form, for, as is well known, it is half incisor and half cuspid, —*i.e.*, the mesial half of the crown is of incisor form like the central, and the distal half is more rounded off like the cuspid. The disto-occlusive angle is rounded, and the distal face presents an eminence like the cuspid. Thus it is graded toward the cuspid form, and the primitive third incisor was probably still more of that shape, as its representatives by reversion would indicate.

FIG. 1.

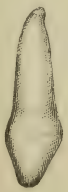
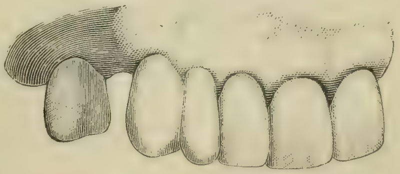


FIG. 2.

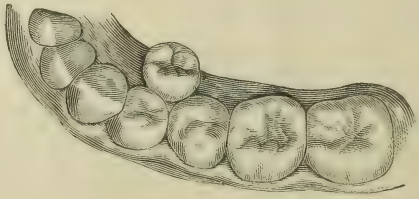


This grading of form is not observable as we pass from the cuspid to the bicuspids in man ; but we must remember that the cuspid often presents a cingulum on the lingual face that inclines it toward the bicuspid form in some lower mammals, as the moles, and that the first premolar or bicuspid is then more caniniform, the inner tubercle being much reduced. This inner tubercle is very variable and erratic as to its many positions. It appears as far front as the centrals, and is often present on the lingual face of the laterals of man. The lingual tubercle is very constant on the first bicuspids of man, and is as well developed as the buccal ; but in some lower forms, as the lemurs, it is quite deficient. It attains its highest development only in the higher quadrumana and in man. Considering these stages of development, the grading from the cuspid to the bicuspid forms was more gradual in the earlier species than in the later, where the individual teeth have taken on special development.

The third premolar, or bicuspid, sometimes reappears in man, but is usually a well-formed tooth when it does appear. It seems to have been the middle one of the three. Baume (*op. cit.*) believes that "He has discovered eleven cases of rudimentary reversion of these lost premolars not cutting the gums. These rudiments were found between the first and second normal premolars. Not infrequently both these missing teeth occur by reversion." In our clinical observation we usually, if not always, find the upper third bicuspid crowded into the roof of the mouth from the interspace between the other two. We should, from analogy, rather expect it to be near the cuspid and be more of a caniniform shape, like the first lower bicuspid. But in earlier forms, the present first bicuspid was more caniniform, as the inner lingual tubercle was considerably reduced, and the cuspid had its lingual cingulum largely developed, so that the transition was more gradual. In man, special development of both teeth has separated the cuspid and first bicuspid widely as to form. The third upper bicuspid is quite rare, more so than the third lower bicuspid ; but both are most interesting cases of reversion to the primitive number of three premolars.

In the lower jaw, it is interesting to note that the first bicuspid is a tooth that shows the gradual transition very well, as it is caniniform in outline, and the lingual cusp is a mere cingulum and not a cusp at all. The crown is formed like a cuspid, with a cingulum raised on its inner face, and belongs naturally where it is now found, next to the cuspid. The supernumerary premolar below usually appears in the interspace between the first and second bicuspids, pointing lingually on account of being crowded in that direction, where it is often the cause of irritation of the tongue, and has to be removed. It is usually of graded form, but more frequently is of a well-formed second-bicuspid type, with the characteristic three cusps of that tooth. Its form shows that it belongs in that position. In the specimen here exhibited (Fig. 3) this is well illustrated. Rudimentary forms of this tooth are very rare, but probably do occur. This cannot be determined until a number of casts and extracted specimens have been collected and classified.

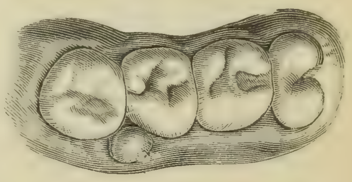
Fig. 3.



The bicuspids grade into the molar series by the succession of the tricuspid molar, which is the primitive bunodont type as found in the earliest mammals and in the lemuroid ancestors of the primates, as Professor Cope has pointed out. The tricuspid molar is repeated in some of the races of mankind, especially the Latin branches. The change from the bicuspid to the primitive tricuspid molar is gradual, but with the addition of the fourth tubercle the transition, as in man, is very abrupt. It looks as if there must have been another intermediate tooth between these two series in the earlier species, but such was probably not the case.

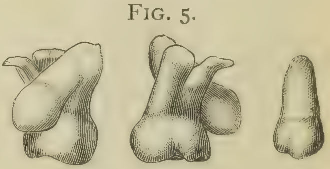
The fourth molar is the missing member of the molar series, and sometimes reappears in man, but usually as a mere peg, upon the buccal side of the second and third molars (Fig. 4). It often requires removal on account of the annoyance it causes. It rarely or never appears posterior to the third molar, except in the large-toothed races, the "macrodonts," as the Negroes, Australians, etc. As Mr. Osborn says (*op. cit.*), "In the macrodont races, Australian, Negro, etc., the fourth molar sometimes occurs. Mr. Mummery reports nine cases in three hundred and twenty-eight West Africans. It has been found in the Tasmanian, New Caledonian, etc.," but these are also Australoid races. Dr. John Ryder says (*Proc. Acad. Nat. Sci. Phila.*), "The skull of an Australian in the Morton collection of the academy has thirty-five teeth. Thirty-four of these are normally arranged, there being a supernumerary molar on each side above. If these had been repeated in the mandible, the dentition would have been as low as that of the South American monkeys. As it is, it is lower than that of the gorilla and chimpanzee in this respect (which have but thirty-two teeth like civilized man), and shows the tendency of even the primates to revert toward the primitive formula of forty-four teeth, prevalent in Eocene times."

FIG. 4.



The fourth molar of complete form is sometimes found in the negro of the United States, and well arranged in the arch. In the white races, however, it is nearly always a mere rudimentary peg, and often fused to the third molar (Fig. 5), rarely or never being of typal form and well arranged in the jaw. A case is reported, however, in which there were four extra molars, one on each side of each jaw, in a white woman (DENTAL COSMOS, vol. xiv, p. 227). The reduction of the jaws in the higher races has contributed to its obliteration, and this contraction is now going on and is crowding out the third molar. The occasional reversion of the fourth molar is interesting, and cases where it presents in full form in the arch are of especial interest to the evolutionist, as exhibiting a return to a condition that takes us back even of the higher apes, which have the same dental formula as man.

FIG. 5.



The whole subject of supernumerary teeth is of great interest when studied from the evolution standpoint. The writer hopes to carry his investigation further by the collection, arrangement, and comparison of casts and supernumerary teeth. To that end he asks all who may have opportunity to obtain and send him casts of supernumerary teeth in the jaws, and the teeth themselves when possible, together with such items of family history as bear on the frequency of their occurrence as may be obtainable. When classified types of supernumerary teeth can be made out, it will be most instructive to compare these types with the originals of those teeth as found in the fossil skulls of earlier mammalian forms, and especially of our lemuroid ancestors, that have been preserved.

ON THE RELATION BETWEEN DISEASES OF THE TEETH AND EARS.

BY ROBERT BARCLAY, A.M., M.D., ST. LOUIS, MO.,

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It was with a view to directing attention more generally to the important relation between the diseases of the teeth and ears that this discussion was originally undertaken. To the busy dental practitioner who keeps abreast of the times it would doubtless prove more acceptable to restrict the essay simply to a practical demonstration of this relation, together with a brief enumeration of the more interesting dental disorders which, in an extensive and miscellaneous otological practice, have been encountered as obvious factors of aural disease.

It may, however, prove more advantageous to preface this by some remarks on the distribution and characteristics of the nerves by which the teeth and ears are physiologically connected. As is well known, the trigeminus, or fifth cranial nerve, is pre-eminently and almost exclusively the basis of this connection. With its dental distribution practitioners of dentistry are peculiarly familiar, and of it hourly reminded. Respecting its terminal filaments in the ear, however, I need only refer to the fact that the greater part of the auricle and external meatus are supplied by its auriculo-temporal branch. By neural anastomosis, as well as through the Gasserian ganglion, we find the dental nerves still further connected with the ear. The tensor tympani, tensor palati, and tympanic plexus, receive fibers from the otic ganglion; the tympanum is supplied as well with filaments from the carotid plexus of the sympathetic and from the great superficial petrosal (from the Vidian).

The trigeminus consists of motor and sensory fibers; fibers having vaso-motor influence over certain regions, notably the ear; and so-called "trophic fibers," upon whose functional integrity largely depend nutrition and reactive power in the regions supplied by this nerve. Such being its character, is it at all astonishing that it should have proved the exemplar, *par excellence*, of nerves in which disorder or disease at one terminal branch produces disturbance at another? And, the neural connection between the teeth and ears being so definite and so intimate, what is the rationale of presuming these organs exempt from that which obtains for the others similarly connected by this nerve! For, that this takes place among the others, we have abundant testimony from many eminent observers. For instance, "reflex neuralgia from the pharynx probably through the palatine ganglion to the superior maxillary nerve," characterized a case reported by Dr. J. Orne Green, of Boston, Mass.,* where the contact of a Eustachian catheter with the mucous membrane, near the mouth of the Eustachian tube, was, at each repetition, attended with severe pain in the teeth of the upper jaw of the corresponding side. "Spasm of the muscles of mastication from irritation reflected through their nerves from another branch (the auriculo-temporal) of the trigeminus'' is known to occur from the fact, as stated by Dr. Ambrose L. Ranney, of New York, that ''the *temporo-maxillary articulation* has often been known to assume a condition of immobility during an attack of earache, and to be immediately relieved by the application of an anodyne to the terminal filaments of the fifth nerve in the auditory canal;'' and, in this connection, Dr. Ranney speaks of having under treatment a patient who, after having in vain submitted to aural treatment for earache of supposed inflammatory origin in the ear, was promptly relieved of this symptom by ''a simple gargle of opium, held for fifteen minutes in his mouth at intervals,'' his aural neuralgia having been reflected through the trigeminus from ''an obstinate ulceration of the tongue.''* If the occasion demanded, one might multiply indefinitely reports such as these, attesting the intimate relationship between other branches of the trigeminus.

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* Trans. Amer. Otolog. Soc. 1874, p. 566, note.

Now as to a demonstration of such connection between the teeth and ears. Hilton has reported a case† where a very painful ulcer of the external auditory canal obstinately resisted all remedial measures until the extraction of a carious upper tooth, which promptly cured the aural disease.

The writer has met with a case of verruca of the auditory canal, very painful, which, after removal, recurred several times during a year; but which, after the extraction of several carious teeth upon the corresponding side, was removed and never returned.

In speaking of aural neuralgia associated with a distinctly diseased tooth upon the corresponding side, other causes and varieties of aural neuralgia being excluded, and where not even a slight connection between the tooth and ear can be made out, Dr. J. Orne Green, of Boston, Mass., says,‡ ''Of course the diseased tooth requires attention, and in all the cases of this form which I have been able to follow the appropriate treatment of the tooth, either by filling or extraction, has cured the neuralgia.''

Dr. Bruns, of New Orleans, La., in reporting|| *twenty-three* cases whose ''ears'' were *not* ''normal,'' of whom *nineteen* had ''hearing'' that was *not* ''good,'' states that there were *nineteen* cases in whom the ''hearing'' was *more* defective on ''the side on which the teeth were worse.''

Dr. Samuel Sexton, of New York, in speaking of ''the special sense-organs,—the ear, nose, and eye,''—states§ that ''under certain conditions of the system'' ''these organs become strikingly susceptible to disturbing influences, and, so far as his own experience goes, from no cause more frequently than from dental irritation.'' Again, he says¶ that of fifteen hundred aural cases, whose records he has received, ''perhaps one-third owe their origin or continuance, in a greater or less degree, to diseases of the teeth.''

With a report of twenty cases of aural disease where dental irrita-

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* ''Applied Anat. of the Nerv. System,'' New York, 1881, p. 170.

† ''Rest and Pain,'' London (New York, 1879).

‡ Trans. Amer. Otolog. Soc. 1874, p. 566.

|| *Archives of Otology*, New York, March, 1885.

§ *The Medical Record*, New York, June 1, 1889.

¶ *Amer. Jour. of the Med. Sciences*, Phila., January, 1880.

tion was obviously either a predisposing, exciting, or sustaining factor, the writer cited, "among the principal conditions giving rise to oral irritation," and, indirectly, to ear-disease, "cutting, crowding, shedding, and caries of the teeth, gingivitis, hyperostosis, pyorrhea alveolaris, periostitis (pericementitis), tartar, hypertrophy of the gums, catarrhal inflammation of the buccal mucous membrane, vulcanized red-rubber and ill-fitting plates and 'dentures,' numerous amalgam fillings, and unskillful dentistry."*

A case of peculiar interest to the dental surgeon, hitherto unpublished, is this: No. 504337. A gentleman, aged thirty-six years, had, about four years previously, suffered for almost two months with a discharge of pus from the left ear. Subsequent to the cessation of the otorrhea he had been annoyed by reverberation of his own voice when speaking, by a ringing sound, and by neuralgia in this ear. The whole left side of his head had felt dull. Supposing himself subject to nasal catarrh, he had resorted to self-treatment.

On examining his left ear, the canal was found to contain cerumen in abundance, but not sufficient to wholly close the lumen of the canal. Physical signs of rhinitis were slight; but upon examining his pharynx and mouth, there was discovered what the writer thought to be a small left superior third molar, seemingly impacted almost directly against its neighbor, and but partially through the gum.

FIG. 1.

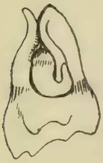


FIG. 2.

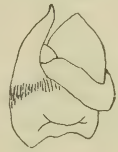


FIG. 3.

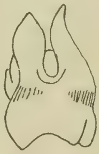


FIG. 4.

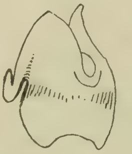


FIG. 5.

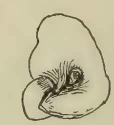
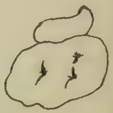


FIG. 6.



By carefully removing the cerumen from the ear, and then inflating the tympanum, the patient was relieved but partially. He was directed to have the crowding molar removed, but did not do so until after what he deemed a reasonable time had elapsed without disappearance of his symptoms. In extracting the offending member, however, the dental surgeon brought away its neighbor, with which it was closely intertwined and conjoined. The singularity of their mutual relationship seems to justify an attempt at its description and representation (Figs. 1–6).† A long, narrow ridge, from the apex, along the posterior surface of the inner (hinder) root of the larger molar, served as a base from which sprang the smaller one. The latter turned outward from its long axis before reaching the level of the cusps of the larger molar, doubling upon itself, and passing forward, upward, and inward, where it encountered and crowded between and beyond the two roots of the larger molar, at their base. These roots had vainly attempted to prevent its intrusion, closely pressing it, their apices above it approaching and bending as if in an attempt to entwine about each other. This curious specimen—

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* *The Medical Record*, New York, Aug. 3, 1889, p. 119.

† The illustrations are reproduced from the author's drawings.

which the writer has been informed is a third molar and supernumerary wisdom-tooth—is still in his possession.

Very significantly, upon the morning after the removal of this anomaly from the jaw, the patient awoke relieved of all his symptoms, which have never recurred.

Case No. 104302. This young man, twenty-seven years of age, who for fourteen years had been working in a noisy shop, had for several years noticed a marked deafness in conversation. His family physician also had remarked it. The patient was annoyed as well by noises in his ears, and, at times, by an unnatural reverberation of his own voice when speaking.

His ear-drums had apparently undergone changes characteristic of catarrhal otitis media.

Of his teeth, the right superior first and second bicuspids and first molar were missing; there were carious, the right superior lateral incisor and cuspid, the right inferior cuspid, first and second bicuspids, and third molar (the last having its pulp exposed), the left superior lateral incisor, cuspid, first and second bicuspids, first and third molars, and the left inferior second bicuspid, first and second molars. On the left side, the pulps were dead in the lateral incisor, cuspid, and first molar. Of the first bicuspid, the roots only remained. There was a supernumerary wisdom-tooth on the outer side of the left superior third molar. The mutual relationship of these two teeth seems, without further description, sufficiently obvious from the drawings (Figs. 7 and 8) of the specimen now in possession of the writer. There was tartar on the front teeth: on the labial surface above, on the lingual below.

FIG. 7.

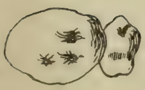


FIG. 8.

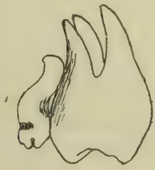


FIG. 9.

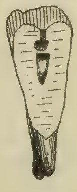


FIG. 10.

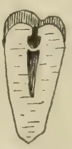


FIG. 11.

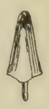
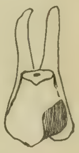


FIG. 12.



Treatment directed toward his aural condition availed little until the patient adopted the suggestion to have all dental irritation removed. Aural treatment was then suspended, and he attended faithfully upon his dentist until all teeth with dead or exposed pulps, and the left superior third molar with its supernumerary tooth, had been extracted, cavities filled, tartar removed,—in short, until all dental irritation had been quieted. The dental treatment has been attended by the happiest results, the patient's symptoms having ameliorated and his hearing improved promptly and steadily thereafter.

The writer himself, upon one occasion, was relieved of an earache by proper treatment of a minute cavity on the buccal aspect of an inferior third molar.

Cases of aural neuralgia and inflammation have been encountered by the writer, which resisted treatment until after the removal of a tooth containing a pulp-nodule. One of these occurred in the case of a prominent dentist of this city. Another, the offending member an inferior second molar, preserved by the writer, is sketched in Figs. 9 and 10.

The irritation from pulpless teeth is one of the most insidious and prolific factors in aural disturbance. One case, recently relieved by extraction of a tender right superior second molar, proved to be due to a small alveolar abscess of the internal root. The tooth had a continuous crown and distal amalgam filling, and, on breaking open (Figs. 11 and 12) the internal root, the root-canal was found to contain a piece of gold wire, which had doubtless been introduced therein under the delusion that it might prove a suitable filling, the crown cavity finally being closed with amalgam.

Whether or not, from the standpoint of conservative dentistry, it be advisable to introduce gold wire into a root-canal and then hermetically seal it; or, when one has broken a broach or other instrument in the root-canal to leave it, "saturate with oil of cloves" or "other essential oil," "fill with chloro-percha" and "keep it dark,"* is a question upon which the writer would not presume to express an opinion; but he thinks that the continued presence of a solid, metallic foreign body in the root-canal of a tooth, hermetically sealed, even if the foreign body be not pushed through the apical foramen, is, as studied from the lessons of practical aural surgery, a procedure of doubtful expediency. And it would not seem infrequent for the metal to be forced actually through the apical foramen, when at a convention of dentists recently it seemed to an experienced and observing member "that every brother had one of those specimens, with the point projecting from one-sixteenth to one-quarter inch, in his pocket."†

Insidious dental irritation reflected to another branch of the trigeminus, if its terminal distribution seem anatomically remote, is apt to escape the attention of both dentist and medical practitioner. In such case the patient, with, for example, neuralgia of the supra-orbital nerve, or with disturbance on the auriculo-temporal nerve, as with earache, would hardly think of seeking aid therefrom of any but a physician. In his ignorance of the anatomy, physiology, and pathology of the trigeminus nerve and its communications, he would never suspect the origin, the source of his trouble, and go to his dentist. On the other hand, should the physician prove negligent or incompetent and overlook such dental irritation, all would be in the dark as before. It behooves the physician, therefore, to be alert to discover and to apprise the practitioner of dentistry of any untoward results remotely attendant upon the various procedures of his craft, of which he and his fellows might otherwise remain perpetually unaware. And as both are brethren in the noble art of healing, the dental practitioner should duly consider such testimony of the physician and endeavor to so modify his procedures and practice as to rid it of all, even the most remote, deleterious influence.

In conclusion, the physician treating troubles of the organs supplied by the trigeminus nerve or its neural congeners, particularly in the practice of aural surgery, should insist upon the eradication of dental irritation from his cases; and if his acquaintance with oral pathology is so limited as to leave him in doubt as to the presence of such aural irritation or disease, he should, by all means, seek counsel in diagnosis from some skillful and conscientious dental surgeon.

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* *Archives of Dentistry*, St. Louis, vol. viii, No. 4, 1891.

† Ibid., p. 155.

HAS NOT TIN FOIL, AS A MATERIAL FOR FILLING TEETH, BEEN OVERESTIMATED?

BY R. C. BREWSTER, M.D., D.D.S., BROOKLYN, N. Y.

(Read before the First District Dental Society of the State of New York, March 13, 1894.)

I AM well aware that this is an old and well-worn topic, and I feel that I shall tax your patience to the utmost by expressing opinions that are diametrically opposite to those maintained by the profession at large, and that adverse criticism will follow one who dares to assail the generally accepted orthodox treatment.

But I shall speak my honest convictions, which are the result of experience, and I only wish I had the power of eloquence sufficient to make plain that which I so deeply feel.

I have made assiduous effort to ascertain just what that desirable quality *is* in tin foil, that in the hands of so many dentists makes such wonderful fillings, while I am unable to do better with it than with many other materials; and though I be eclectic and try to fill each cavity with good judgment, I still find, when I use tin foil and make fairly good fillings, I do so at an expense of time and vital force, both to the patient and myself, not justifiable by the conditions, and I often wish I had used some other material.

The fault may be with my method of manipulation, although I have tried every method of which I have ever heard; but whatever has brought me to my present opinion, I feel I shall not have written this paper in vain if it will only call forth debate on a question upon which I have never heard but one side.

From my recollection of the early instruction I received regarding the different materials for filling teeth, tin foil, for its preserving quality, took first place, without much differentiation as to the conditions. Singularly enough, in the light of age and experience, the query now strikes me with considerable force as to why I saw so few fillings made with that material, and I remember with distinctness that each special cavity under consideration was not thought to be one for which tin foil was indicated.

From then until now I have frequently read in the dental journals articles from able writers, patriarchs in the dental profession, of the chemical something that tin foil possesses above all other metals, in bearing good companionship with badly calcified tooth-structure. When all other materials failed, tin foil would come to the rescue.

At the first dental meeting I ever attended, discussion was had on this subject, bearing out the same opinion; and frequently during the subsequent years, and particularly last summer at the World's Columbian Dental Congress, in Chicago, in the department of operative dentistry, presided over by Dr. Jarvie, of Brooklyn, the same faithful adherents to this material gave testimony to their untiring faith in the all-preserving properties of tin foil; and down to the present season fresh evidence has been adduced, which proves that no depletion has come to the ranks of those who claim for tin foil a superiority over other materials.

From such unanimous testimony I have always felt that in order to do the best for my patients I must follow in the footsteps of those who are acknowledged to be authority on the subject.

To this end I bought book after book of tin foil, that which was freshly beaten and that which was old, and did my level best, using serrated points, broken points, and smooth points, with hand pressure and the various kinds of mallets, although a combination of hand pressure and hand mallet, with finely serrated points, worked the best.

I wound the sheets of tin foil into ropes, alone and with gold foil, sometimes one of each, and at other times a sheet of gold between two sheets of tin foil, and then again I would reverse it, and put one sheet of tin between two sheets of gold. When the *gold* is annealed it has a tendency to produce a harder filling; but, the greater the amount of gold, just so much farther is it removed from being a tin filling. At first I used No. 4, but I found that too coarse, harsh, and heavy. Then I had Edward Rowan beat out No. 3 for me. This was softer, and I did much better, and I thought I at last had found the secret of success; but in a few months I found that these fillings were no better, and in many instances not so good, as I could have made with other materials.

The locations to which I gave especial attention were the cervical portions of approximal cavities in bicuspids and molars.

Take, for example, such a cavity which also includes the crown. With well-prepared retaining points and undercuts, I proceeded to fill, sometimes with ropes, which I would feed by loops into the cavity. Sometimes I would cut these ropes into small pieces, to correspond with the size of the cavity, and place them in, in the method of pavement epithelium or wedge filling. And then again I would fold them into ribbons of proper size, and cut them into small pieces, making the same wedge filling.

I could never condense such a filling to make it a solid homogeneous mass, either by hand pressure or mallet, or both, although I always obtained a firm foundation upon which to build a gold filling. But before inserting the gold I would burnish the tin foil to the edge of the cavity, and cut away with a file all overlapping edges.

At this part of the operation I usually felt a sense of security for that part of the tooth; it always looked nice, and I thought I had done a grand good thing, of which in later years I would be proud.

That some of these fillings are yet in good condition I have but little doubt, but many of them have proven complete failures, and caused me pain and chagrin.

Let me ask you, gentlemen, if in later years, in examining such a filling, you have never found that an excavator easily entered it and a sense of disappointment came over you? Let me ask you, also, if you never found additional softening or decay in the direction of the apex of the root, and that the chemical something of the tin foil had failed to preserve the adjacent parts?

Take, for instance, the same conditions where at the cervical border you have filled the cavity with gold foil, with the same scrupulous preparation in polishing the edges, etc., have you always found the filling soft or imperfect, or has the tooth-substance always softened and decay extended in the direction of the apex of the root or in any other direction, or, in other words, is it always a failure?

On the contrary, I venture the statement that many, and even by far the largest per cent. of such gold fillings, do remain perfect, because of the greater effort in recent years for perfection in that part of the operation. And I also maintain that the adjacent tooth-structure does not soften in the direction of the apex of the root more with gold than with tin, but when such softening and decay does occur, it is due to other causes, such as pathological secretions of the oral cavity, a pocket for the lodgment of food, imperfect calcification, and a low power of resistance to these destructive influences. The power of resistance to these influences is dependent upon the density of the tooth-structure, and the presence of tin foil within a cavity can in no way prevent their action from without. Again, that the action of these influences is limited in proportion to the density of the tooth is proven by the fact that we sometimes see nearly an entire root denuded of both hard and soft tissue without decay.

Suppose that we take the identical conditions, the tooth prepared in the same careful way, and insert in the cervical portion amalgam,—a method that seems increasing in popularity,—and the remainder of the cavity, approximal and crown, with crystal gold.

The range of possibilities within the reach of such fillings seems almost unbounded, and the testimony of many estimable gentlemen who have used it has secured for it a place among the first-class operations.

I will go even further, and ask that if in the majority of cases when such a cavity at the cervical border is large and difficult of access, is it not your invariable rule to fill such a cavity with amalgam to the exclusion of all other materials, especially tin foil?

Another class of cavities where tin foil seems indicated is the cervical border of the buccal surfaces. In this location tin in the front teeth is excluded by reason of color, unless combined with gold foil. It is here that the advocates of tin foil make a firm stand, and it is here also that I make an equally firm resistance.

Combine tin and gold in any proportion you choose, and you cannot approximate the color of the tooth. It is true that the luster of the gold is diminished, but there still remains an uncertain color that is equally noticeable, which does not impress one with the idea of cleanliness that a beautifully contoured and polished gold filling does; and what is more desirable than cleanliness, which in itself is beautiful, and gold is equally if not more lasting.

As we go farther back in the mouth, the difficulty in using tin is increased, because of the necessity for wedge fillings, while a gold filling is not dependent solely upon that method of manipualtion. Then again, tin-foil fillings in this location are sometimes worn away by the mechanical force of the tooth-brush, while gold fillings will not yield. How frequently have we patched gold fillings at the cervical portion of approximal surfaces with amalgam, when time or circumstances prevented our doing better, and how surprised we have been at the good result. On several occasions I have removed a disintegrated tin filling at such a location and inserted amalgam.

Certainly no claim for cheapness can be made for tin-foil fillings, as they require as much in time and ability as gold fillings, and time and ability are the fundamental principles that control the law of compensation for all services.

My fidelity to tin foil has cost me dear, and I will narrate one instance where I filled the lower molars and bicuspids at the cervical border, buccal surface, four on each side, for a gentleman who was about to start on a tour around the world. I assured him of the lasting properties of these fillings. Fancy my consternation when, three years later, he returned to me with not one of these fillings intact, and said, " Young man, you must atone for your misrepresentations." I did, and refilled them with gold, and now, after five years, they are perfect.

In the filling of all cavities in teeth, there are a great many conditions that tend to influence the mind of an experienced operator, as to the material that would best serve the purpose of preserving the tooth,—viz, the age and condition of the patient, the density of the tooth, its location in the mouth, and the accessibility of the cavity. While this is true as to dentistry in general, it is especially true in the case of children's teeth, and I think the success lies, not so much in the material used, as in the personal magnetism—or hypnotism, shall I call it?—of the operator, whereby he is able to keep the little patient quiet, dispel its fears, and thus have a chance to prepare the cavity, after which the insertion of the filling is easy enough. But when the patient is wholly beyond control, and, as Dr. Brockway says, "has a devil in him as big as a woodchuck," I think the operator will do well if he fill a cavity for such a patient with amalgam. Fancy trying to fill such a cavity with tin foil, and the doubtful worth of it if filled.

For a long time, when favorable cases presented, it was my invariable rule to fill the crown cavities in the first permanent molars of children with tin and gold, and as a masticating surface it did fairly well, unless an opposing cusp articulated deeply into the center of the cavity, in which case it soon wore away.

But often a sensitive cavity and a still more sensitive patient have compelled me to desist from further excavation, and proceed to fill, lest my patient succumb to the strain of the operation; and thus an improperly excavated cavity can be no better when filled with tin and gold than with amalgam, with the chances in favor of the latter when the cavity is wiped out with mercury bichlorid or silver nitrate. That I do not advocate the filling of a cavity that is not properly excavated goes without saying, but there are times when a little tact and good judgment will do more for a child's tooth than tin foil. Unless I can have all the conditions favorable, a submissive patient, a favorable cavity properly excavated, I no longer trust my reputation to the uncertainties of tin foil, but use amalgam. But when all these conditions are present, I use gold.

In regard to the crown cavities in deciduous molars, it was the rarest exception when I filled them with tin; and I now use amalgam, gutta-percha, and sometimes oxyphosphate.

This afternoon I showed at the clinic a lad whose lower left first permanent molar I filled, three years ago, with base-plate gutta-percha. It is still in good condition. Would tin foil have done better?

We sometimes hear of tin-foil fillings that have stood for twenty or thirty years. But do we not also hear more frequently of gold, and even amalgam fillings, that have stood just as long? Why are not they equally good when of the same age?

Does not the texture of the tooth bear great relation to the age of the filling? If the tin-foil filling protects the cavity from moisture from without, what possible protection can it render against moisture from within that other fillings do not give?

The moisture from within that enters through the tubuli to the surface of the filling is a mischief-maker.

I believe it is here that especial claim is made for tin, because of its being the poorest conductor of the electrical current, as between gold and amalgam, that the action of this moisture on the tin produces a coating on the surface of the cavity, which acts as a preserving agent. This moisture is of the nature of the serum of the blood, and contains sulfur salts, and this acting upon the tin produces the sulfid of tin. But these salts do not affect gold. Therefore this coating is the product of the decomposition of the tin by the sulfur, and enters the adjacent canaliculi. Consolidated dentine may supervene, but this occurs just as often under gold fillings, and I have sometimes seen it on the removal of amalgam fillings. The scope of this paper is not intended to reach into electrolysis, histology, and pathology, although the line of argument tends in that direction, and would naturally lead up to it, but I have endeavored to avoid it, and to give, instead, a practical every-day side of the question, for fear that others, like myself, should become "lost in the fog." Dental literature is replete with fine, hair-splitting arguments on histology, electrical currents in the mouth, and the pathological sequelæ; but give us now some method whereby, in the hands of ordinary dentists, good honest fillings can be made.

If such good fillings are made by some operators, it surely must be in their method of manipulation. Is it an especial talent born to a man, or is it a secret held by a select few?

In order to get at, to some extent, the attitude of the dentists of the United States upon this question, I have made inquiry at several of the leading dental supply houses as to how much tin they sell in America. I will give you some of the replies.

The S. S. White Company say,—

New York, March 2, 1894.

Dr. R. C. Brewster, Brooklyn, N. Y.

Dear Sir,—Yours of the 26th came to hand, and it is very difficult for us to give you an intelligent answer to your inquiry. We sell quite a quantity of tin foil, but we are not aware that it is all used for filling teeth. Considerable portion of it is used for mechanical purposes, such as covering casts, etc., but we believe a very small portion of it is used in comparison to gold and other filling-materials. As nearly as I can learn, we sold probably about one hundred books last year, which, in comparison to the books of gold foil, possibly would not be one one-hundredth part. Yours truly,

The S. S. White Dental Mfg. Co.,
per F. C. Harmstad.

Mr. Sykes, of Claudius Ash & Son, says they sell no tin foil in America, but in England they sell some, and on the continent they sell "quite a good bit." This, no doubt, to some extent explains the superiority of the American dentist abroad.

The Brooklyn Dental Company said they "sold very little,—not more than half a dozen books per annum."

A. W. See & Company said they sold "very little."

R. S. Williams wrote as follows:

New York, February 28, 1894.

Dr. R. C. Brewster, Brooklyn, N. Y.

Dear Sir,—Yours of February 26th duly noted. The amount of tin foil sold for filling teeth is very small compared with other filling-materials. It is difficult to give exact figures, but I should say that there is less demand for it than for any other one kind of filling-material, and so far as I can observe, its sale is on the decline. The number of dentists in the United States is fully given at fifteen thousand to eighteen thousand

Yours respectfully,

R. S. Williams.

Add also to this the fact that some new publications do not mention tin foil in their list of filling-materials. This is a silent testimony of an overwhelming majority.

If tin foil is such an excellent material for filling teeth, *why* is so little of it used?

And now, gentlemen, after nearly one-quarter of a century in the use of tin foil, I am convinced that it has no place for usefulness among my list of filling-materials, and unless I can have some new light thrown upon the subject, I shall never again insert a filling where tin foil enters into any part of the composition; and I am forced to the conclusion, as expressed by the title of this paper, that tin foil as a material for filling teeth *is* overestimated.

SALOL IN FILLING THE ROOTS.

BY A. E. MASCORT, D.D.S., PARIS, FRANCE.

It has been stated with certainty that at present no other branch of dentistry engages the attention of practitioners more than crown- and bridge-work. The movement going on about this special department of dentistry has given rise to great enthusiasm in the care and treatment of pulpless teeth. A limited number of practitioners are engaged in taking the utmost care of all those decayed teeth "generally consigned to the forceps," in order to restore them to health. This is simply because these same victims of the ravages of decay are often the ones most needed for the support of artificial crowns, for maintaining articulation, for preventing other teeth from getting out of place, and to serve as abutments for sustaining bridge-work. Among the most fundamental of all the principles upon which this work is grounded, is the restoration to health of the remnants of teeth. It is not until we consider a mouth presenting an otherwise favorable opportunity for placing in it one of the many varieties of crown- and bridge-work, that the value of a diseased stump is well appreciated. These nearly worn-out roots are often the only effective foundation to build upon, and it is really astonishing the great amount of force that can be supported by one of these roots after having been restored to health.

The question is how to cure these roots. Nowadays it is not necessary to insist upon the importance of root-canal treatment. Every dentist lays upon this particular subject the greatest stress. Consequently dental literature is full of the discussion of it, so that it is hardly possible to say anything new relating to it. The methods of filling the root-canals of teeth are, however, not all known yet. In presenting another one, I candidly state I do not know whether it is new or not. The method, I think, is particularly my own, but I do not claim any originality for it.

Taken in general, the roots we are called upon to deal with are of two classes. One is that of teeth with pulps still living, whose devitalization is, or is not, agreed upon, while in the other class are included all roots whose pulps have begun to die or are quite dead. A further division will subdivide the first class into roots with non-exposed and exposed pulps, and the second class into roots with diseased pulps, with dead pulps not involving other complications, and roots with dead pulps accompanied with morbid states,—*e.g.*, neuralgia, periodontitis, abscess, fistula, caries of the bone, etc. It would exceed the limits of this paper to consider the treatment to be followed with all these roots up to the point of being made ready to be filled in a permanent way; I shall therefore refer only briefly to the matter. For the devitalization and extirpation of the living pulps I cannot do better than refer to the instruction given by Professor J. Foster Flagg to his pupils.* With reference to the treatment to be followed in all sorts of "dead teeth," the reader will pursue the method he prefers. I am myself an advocate of antiseptic surgery, so that I always, in every case, in every operation, no matter how simple, employ antisepsis with the most scrupulous care. But for sake of conciseness let me suppose the canals ready to be filled, which, according to the principles I follow, is as soon as they are sterile. Now, taking for granted they are made sterile by any one of the methods adopted, I proceed at once to the operation of filling them.

There is a point to which I would here like to direct special attention. Whenever decay has not gone so far as to produce *direct* communication with the canals, it is indispensable to establish it before undertaking any treatment of the roots. The only serious objection would be the fear of injuring sound tooth-tissue. This in fact does not amount to much. The methods of filling and replacing carious teeth have reached such a degree of perfection that no danger can be expected from cutting a tooth anywhere, for, if the hole is scientifically filled, that point in the tooth is certainly safer from decay because of the greater resistance of the material used.

It has been stated that the future of a pulpless tooth depends on the insertion of a proper root-filling. What is a proper root-filling? I think it may be taken for granted that a proper root-filling is that which will completely replace the pulp. Now, accepting this as an ideal in root-filling, the question arises, Has this ideal filling ever been reached with any of the methods known in general practice? I doubt it, simply because all the methods known are deficient for the ends for which they are intended. We will read over a long list, without the possibility of pointing out even one that is in all respects perfect. Among these we will include gold, lead, wood, cotton, cements, gutta-percha, etc. The last mentioned is the best which is at present available. However, some writers have spoken of the *perfection* with which a root-canal can be filled with gutta-percha. Gutta-percha can never *perfectly* fill a root-canal, though we have been compelled to use it for want of a better material. This point demands some explanation before following with the main subject of this paper.

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*O. E. Inglis, "Dental Pathology and Therapeutics," Phila., 1887.

Now let us see how gutta-percha works. A solution of it in chloroform (chloro-percha) is most used. To carry it to the end of the canal, the chloro-percha is pumped into the canal with a smooth broach. Supposing the gutta-percha can be carried to any point, how can it be ascertained whether it has filled the canal to the very end? It has been said that when pumping chloro-percha into a canal, the distance to which it has penetrated may be known by looking at the broach, though if the broach is clean for any distance from the point, the filling-material has not penetrated beyond that place. Even admitting this, after they are filled, are they *properly* filled? For the moment, yes; but in a few days the chloroform is gone and the mass shrinks, retreating from the walls of the canal, giving lodgment to infiltrations that cannot be carried away by the circulation. To avoid this, an ingenious method has been proposed. After the gutta-percha has been pumped up to the apex, thrust into the canal a fine point of dry gutta-percha to fill it. This point will not touch the walls of the canal, because liquid chloro-percha remains between the bulk of the cone and the walls of the canal. All this is very nice in words. In carrying this out in practice it happens generally that while forcing the point into the canal it pushes before it a small mass of chloro-percha, which, passing beyond the foramen, produces pain by wounding the tissues of the jaw; or the point itself, in passing through the foramen, causes the wound. "This is a sign to stop," a writer says. What for? To await periodontitis, most surely caused by protrusion of filling-material beyond the apex of the root. After the mechanical irritation set up by the presence of the material in the pericementum, periodontitis will follow most surely. And what is to be done then? In such emergencies, we are prone to consider that the methods at our command by which to fill the canals of teeth are not really perfect ones. This will most certainly not cure the disease. Is there any positive way to avoid these troubles in using gutta-percha? I don't know any. We have to work in darkness. Sometimes we pass beyond the apex; sometimes we leave a space unfilled. Skill is our only resource. Perhaps the development of the *tactus eruditus* to an extreme degree may help us here better than elsewhere.

Since January of last year I have been employing salol in root-fillings with the greatest success. I have employed it in so many different cases that I feel confident in recommending it, not only as the best thing ever used for that purpose, but as the only substance proper for that purpose. Trying to dry out a test-tube in which to dissolve some salol in absolute alcohol, I heated the tube over a spirit-lamp, to evaporate all the moisture left by the water I employed to clean it. While the tube was warm, I put some salol into it. Much to my surprise, the powder began to turn into liquid. I recollected having read that this substance fuses at a low heat. But what struck me the most was, that it crystallized again in a solid mass a few minutes after. Having been engaged a few minutes later in filling the pulp-canals of a tooth, the peculiar properties of salol led me to think of employing it for filling. A series of experiments out of the mouth assured me that I was going to succeed when employing it as a material for filling root-canals. Every day I was more and more satisfied with it, and at present I do not employ any other substance. I have cured with salol roots of teeth so badly decayed that before using this substance I never could restore health in such cases, despite the most thorough antiseptic treatment. I rely upon salol now for the permanent filling of the roots of any tooth whose canals can be disinfected or sterilized. The treatment and filling of root-canals at a single sitting, according to the principles submitted to the profession, in 1886, by Dr. C. T. Stockwell, of Springfield, Mass., has been my usual method in the few past years, but it was always in the substance employed to fill the root permanently that I encountered the greatest obstacle in doing so. At present, I have overcome this difficulty with salol. I do not know a more useful help for root-filling.

Salol is a compound in which one hydrogen atom of the salicylic acid has been replaced by the radical phenyl. To obtain it, the perchlorid of phosphorus, or the oxychlorid of carbon, or nascent chlorhydric acid is made to act on a mixture of salicylate and phenate of sodium.* It is now obtained by another method. At 120° C. the oxychlorid of phosphorus is made to act on a mixture of salicylic acid and phenol, producing the salicylate of phenyl or salol.† Thus obtained, it is in the form of a white crystalline powder, insoluble in water and glycerin, but readily soluble in ether, alcohol, chloroform, benzine, spirit of turpentine, copal balsam, liquid vaseline, fixed and volatile oils It has a fragrant taste, and smells similar to the essence of wintergreen. At 40° C. it completely fuses into a liquid. When the temperature is raised to or near its boiling point, it retains the liquid state after the temperature has again fallen below its melting point; even at the ordinary temperature of the office-rooms it will remain fluid from fifteen to twenty minutes, but if fused at the lowest possible heat, it then returns, in a few minutes, to the solid state. This substance has also the peculiar property of forming intimate mixtures with iodoform, aristol, and camphor. Melted together, salol and aristol, salol and iodoform, become liquid, like salol alone, which form in a few minutes a solid mass, not a new chemical product, but a mixture of two substances, having each one of them all of its characteristic properties, excepting the new form of crystallization. Salol was proposed by Professor Nencki as a substitute for salicylate of sodium. Its general use is that of an antiseptic.

A few points about the manner of using liquid salol for filling the pulp-canals will be noted here. It is generally accepted by the profession that absolute dryness must precede the filling of the roots. Dryness around any tooth can always be obtained by aid of some of the many devices for that purpose. For drying the canal after having been sterilized, I employ a definite method. Let us suppose the rubber-dam or similar appliance to be in place. I employ absorbent cotton, made antiseptic with mercury bichlorid, for sponging the water around the tooth to be treated. With bibulous paper, or better, with paper-fiber lint, I absorb the moisture from the cavity of the decayed tooth. French Joseph's paper is cut in strips about five millimeters broad. These ribbons are then cut in such a manner that they form small rhombs, not more than three centimeters long. Twist these pieces of paper very tightly, so as to form very fine points, whose extremities are the acute angles of the rhomb. There is nothing more useful than these points of absorbent paper to carry out any liquid contained in the canals. With these twists, I absorb, first, the remainder of any solution employed for sterilization. When they have removed the main mass of water, I inject absolute alcohol by means of a hypodermic syringe.* The avidity of absolute alcohol for water makes it absorb any that may be left within the canal, or even in the dentinal tubules. After a minute's injection, again using the twists, I absorb the now hydrated alcohol. For insuring more thorough dryness, another injection of absolute alcohol must be made. Absorb it in the same manner, and then pass a slow current of warm or hot air into the canal or canals for a few minutes. After drying with absolute alcohol and hot air, if the roots are not affected with abscesses or fistula, I insert, as far as I can without harming the patient, the Evans root-drier. Then the root is ready for salol. Pour a little of it in a small test-tube, where it is liquefied over a spirit-lamp. Take some of this liquid in a warm hypodermic syringe, and by using a very fine needle this warm substance may be injected to the very apex. Little skill is required to do this. After the needle is introduced in a canal, the liquid is injected to an amount that will not exceed the quantity needed to fill the canal. The needle must be withdrawn very slowly, always throwing in liquid when retiring it, so as to replace its bulk by the liquid pouring from it. If all this is neatly done, the whole amount of liquid injected will be suspended by capillary force in the canal on account of the small caliber of all canals, no matter in what jaw. Let the liquid now crystallize. In a few minutes it will become nearly as hard as the dentine. I then clean out any little excess dropped over the tooth outside the place it is wanted, by using a pledget of cotten moistened with ether or absolute alcohol.

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* "Revue des Médicaments nouveaux et de quelques medications nouvelles." C. Crinon, Paris, 1891.

† "Chimie Organique Elémentaire." E. Grimaux, Paris, 1892.

To make twists of absorbent paper, I employ the services of a lady, whose hands, twice washed with phenated soap and water, are then kept for fifteen minutes in an antiseptic solution before commencing the work. The paper also has been sterilized in a stove, at a heat compatible to its nature. These fine twists save much time. A box of them all ready made will save much inconvenience. But this is not all. The management of so small an object requires a peculiar technique, that, when lacking, may impel the operator to throw them aside as useless. There are few points to consider, but they are of the greatest importance. The first is to keep a bundle of the points in a dark-colored little handy box that may be kept in the drawer of the bracket-table. They must be kept in a straight, orderly line in the box. To use them, put the lid of the box upturned on the table, pick up with the end of the pliers a bunch of five to ten only, and scatter them on the lid so that they may be conveniently picked up one by one. Lift each one by the middle with the pliers, so as to thrust it at once through the canal. The point untwists itself a little as soon as it is wet, which prevents it from pushing forward, but if put to the entrance of the canal and thrust forward rapidly, it will reach the apex, no matter what the form of the canal. They can be made so fine that they will pass through the foramina. After having well imbibed the liquid, take the point out at a stroke. Never use the same one twice. Never leave it too long in the canals.

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*Lately I have been using the hypodermic syringe of Dr. G. Beck, of Berne. It is one of the best that can be used with regard to antisepsis.

The assertion has been made that the roots ought to be filled in such a manner that they could be unfilled without much difficulty. I think this right. The need may come from disease. In a previously infected and putrid root-canal, who would wonder at an accidental relapse of morbid action about such a tooth, despite the most appropriate treatment, since we know this same tooth has necessarily to remain in the mouth, which is a constant focus of infection? Supposing that pericementitis sets in, the soreness to the touch would make it nearly impossible to unfill the root, if it has been filled with a material more or less resistant. But in the case of a filling made with salol, there is no such inconvenience. A heated instrument will instantly unfill all the contents in the largest canal by a mere touch, and, while liquid, a fine cone of absorbent paper will absorb the salol. Any canal can be emptied in a few seconds, without the slightest pressure upon the sore tooth.

The objection may be made to the use of salol, that it is apt to pass through the foramen and beyond the apex of the root. It, however, does not oppose the same objection in this regard as gutta-percha. Salol is in itself an antiseptic, containing about thirty-eight per cent. of phenol. The presence of a substance like this introduced into different tissues has been recently shown to be most favorable.* It could not be otherwise. Foreign bodies produce inflammation of tissues only when they are infected. Leber has stated that indifferent non-oxidizable foreign bodies aseptically introduced into the tissues or cavities of the human body caused no suppuration.† Now, if indifferent bodies can be tolerated by living tissues without inconvenience, how much more so can a body which is not only aseptic, but, at the same time, antiseptic. A few days ago, I lifted from the crown of a lower molar a mass of oxyphosphate-of-zinc cement, which I put last year over a mass of salol filling the chamber of the pulp. When I inserted the filling, the bottom of the cavity was decayed to the pericementum, so that I had to keep over it a piece of absorbent paper to dry the blood coming out. When the salol was sponged out, after having been melted by a heated instrument, I found that everything had gone so well under this layer that the surface, before bleeding, had now the appearance of a newly formed tissue.

Salol can be successfully used also for pulp-cappings. Mixed with iodoform, aristol, or oxid of zinc, it forms a mass most useful for capping exposed pulps.

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* M. P. Reynier, Société de Chirurgie, Paris.

† H. Knapp, *Medical Record*, December 25, 1886.

THE TREATMENT OF TEETH WITH DISEASED PULPS.

BY PRIVAT-DOCENT DR. C. RÖSE, FREIBURG, BAVARIA.

THERE is scarcely a subject in dentistry upon which so much has been written and concerning which opinions are so greatly at variance at the present day as that of the so-called root-treatment. Hesse* justly observes "that there are almost as many methods of operating for this condition as operators. Every dentist regards his own procedure the best, or even the only proper one."

It is a remarkable fact that different dentists obtain results diametrically opposite with one and the same method. Baume's borax treatment, for example, has yielded excellent results in the hands of some, while in others these have been unsatisfactory. This discrepancy is only explicable upon the assumption that careful selection of cases was practiced by the one party, while others exercised no selection whatever, and carried out the details of the treatment with less thoroughness. The period of time, moreover, during which a given case has been under observation is also to be taken into account. Many cases promise good results, but, in spite of the favorable outlook, the tooth is eventually destroyed, after the lapse of months or years, by pericementitis.

Very many dentists, even at the present day, do not distinguish in respect to the treatment between a tooth affected with a mild grade of pulpitis and one with purulent or even gangrenous pulp. They are all treated in the same fashion. Besides, too little stress is laid upon the general condition of the patient,—an oversight dependent upon the extreme degree of conservatism just now dominant in dental practice. There is a vast difference, as regards prognosis, whether the diseased pulp occurs in a robust and healthy or a weak and anemic subject. In the latter, the same treatment, however excellent, will of a certainty be followed by more frequent failures. The prognosis should be very guarded in subjects of depraved constitution, in whom every wound, however insignificant, takes on suppurative action.

Every tooth with a pulp dead or devitalized by arsenic is a foreign body in the jaw. We now know that foreign bodies may form adhesions without giving rise to symptoms, if they can be rendered and kept aseptic. On the other hand, experience teaches that foreign bodies so encysted, as bullets, bits of glass, etc., give rise to renewed inflammation and suppuration in the surrounding tissue, in many instances only after the lapse of years. Such an occurrence is most apt to take place where the system of a previously robust individual becomes depressed in consequence of general disease. It may be assumed, in such cases, that the vitality of the cells in the neighborhood of the foreign body has been lowered to such a degree that micro-organisms carried thither by the blood are enabled to gain a foothold and multiply.

Exactly similar phenomena can frequently be observed in teeth whose root-canals have been filled in exact accordance with the rules, and which could be regarded as perfectly free from germs. In most cases, of course, this freedom is only apparent. At certain unapproachable points of the root-canals, bacteria or their spores will have remained;

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* *Deutsche Monatsschrift f. Zahnheilkunde*, 1892, p. 356.

but in the absence of a favorable soil, these have only been able to maintain a bare existence. The ptomaines enter the tissue surrounding the pericementum, at the apex of the root, in very small amounts, so that they can be absorbed by the white blood-corpuscles, and carried away by the blood. If these products are, for any reason, produced in increased abundance, or if, in consequence of general disease, the vitality of the blood-cells is diminished, pericementitis of greater or less intensity occurs. Observant patients in whom this has taken place sometimes state that they experienced a "drawing" sensation in the tooth for some time after treatment; this subsided, and no distress of any kind was complained of for years. In other instances no symptom whatever was experienced until the sudden occurrence of pericementitis.* I have myself found malodorous remains of pulp in the root-canals of apparently healthy teeth, with well-fitting fillings which had been extracted at the instance of the patient to make room for an artificial denture.

Irritating substances such as croton oil, turpentine, and strong caustic antiseptics, may, as is well known, give rise to inflammation and suppuration without the presence of micro-organisms. If a root-canal has been filled with a strong paste of corrosive sublimate, for example, it is impossible but that minute quantities of sublimate in solution should reach the pericemental tissue through the apical foramen. Where the vitality of the cells has not suffered, the remedy will probably be absorbed without the occurrence of symptoms. In other cases, however, it becomes the cause of acute and chronic irritation of the cementum, from which the tooth never fully recovers. The fact that a sublimate filling of the root-canal is able to discolor the whole tooth in a short time proves that the drug penetrates the canaliculi of the dentine as far as the pericementum. Signs of irritation may accordingly be observed affecting the whole extent of the pericementum. The other soluble and powerful antiseptics, like concentrated carbolic acid, cinnamon oil, etc., produce effects similar to the sublimate. They have, besides, the great disadvantage of rendering the delicate tissues of the tooth more or less brittle. For these reasons, I regard the employment of excessively powerful antiseptics in the root-canals, as recently recommended, especially by Miller, a great mistake.

The conviction has long since become general among surgeons that the practice formerly in vogue of washing wounds with large quantities of antiseptic solutions is a mistake. Not antisepsis, but asepsis,—*i.e.*, perfect cleanliness,—is the endeavor in the modern treatment of wounds. We must make this our aim also in the treatment of diseased teeth. Hollaender is accustomed to say to his pupils, "Treat diseased pulps with whatever remedies you will. Only take great care and practice perfect cleanliness, and satisfactory results will not fail to follow."

Every plan of treatment of the root should have for its object (1) to render the root-canal free from germs; (2) to fill with any sterile substance; and (3) thereupon to seal with an air-tight covering.

The first indication is the most difficult to meet. For this purpose an effort must be made in every case to remove all remnants of pulp to the apices of the roots; after thorough disinfection, the root-canals are to be filled with gold, cement, gutta-percha, etc. This, the oldest method, is perhaps the best even at the present day for all cases where it can be certainly carried out; that is, in all uni-radical teeth. There are, however, certain cases where the most skillful hand and the most delicate instrument fail to relieve the canal of its organic contents, by reason of the anatomical conformation. To this group belong in particular the anterior roots of the lower and the buccal roots of the upper molars, and the roots of the bi- and tri-radical premolars. There are dentists, it is true, who loudly aver that they are able to cleanse and fill every root-canal to the apex. I assert emphatically that these gentlemen are deceived. Excavation of the root-canals fails in the case of curved roots; the tool frequently takes a lateral direction and penetrates the periosteum of the root. This being the case, it is not strange that attempts have been made to discover simpler methods which should do away with the necessity of evacuating the root-canals. All later methods of this nature have a common purpose,—the readily accessible pulp of the crown is removed, the contents of the roots, having been rendered aseptic, are permitted to remain within the narrow canals as the natural filling (impregnation with borax). The father of all these methods is Witzel's; the procedures of Baume and Herbst are only to be regarded as modifications of Witzel's method.

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* Chronic periostitis of a mild grade may indeed exist for a period of years without symptoms.

Miller has recently made the modern methods of amputation the subject of certain researches, and has sought, following Witzel, to attain the object by the employment of the most powerful antiseptics. As remarked before, such a procedure is a mistake To attempt to sterilize a root-canal with corrosive sublimate in powder is like trying to kill a sparrow with a cannon. In the method suggested by Herbst, Miller has no confidence whatever; he entertains, moreover, but slight hopes that impregnation methods will hold their ground; if these could be made reliable, they would prove a blessing to suffering humanity. I cannot at all agree with this pessimistic view of Miller. I have obtained most excellent results from Herbst's method, a method which seems *a priori* so unscientific. I recommend it most heartily in suitable cases by reason of its simplicity. Of course it is not adapted to every case. Herbst's method is altogether unsuitable in cases where the pulp has become gangrenous or is in a state of advanced suppuration involving the root; on the other hand, it is indicated in cases (and these form the great majority) of commencing inflammation of the pulp, of hyperemia pulpæ, and of pulpitis partialis.

Cases of pulpitis totalis purulenta and of pulpitis gangrenosa are frequently, but by no means always, complicated with pericementitis. For this reason an exact diagnosis is indispensable; the character of the affection must be rightly understood before instituting treatment of the diseased tooth. If the pulp is in a state of decomposition, its remains must be removed as thoroughly as possible with nerve-needle and syringe.* Only in cases where the root-canals have been thoroughly cleansed and filled with a sterile filling to the apex of the root are we justified in entertaining hopes of a certain cure. It is by no means necessary that the root-filling should consist of a powerful antiseptic. In a given case the question is not what the substance which we are about to introduce into the root may be, but rather whether we have thoroughly removed all decomposed organic remains. Werner's remarks in this connection are *apropos*: "The parting instruction given by a parent to his son beginning a journey will be of little use if the son has not been rightly trained. So unless a root has been thoroughly cleansed of all decomposed and decomposable matter the filling will be of little use, even if it consist of a mixtum compositum of all known disinfectants "[*] Iodoform has been proven to possess but weak antiseptic powers. Notwithstanding this demonstrated fact, experienced practitioners have not relinquished their preference for this substance as a filling for roots. Other fillings are, however, just as serviceable, provided their nature is such that the minute quantities which may happen to traverse the apical foramen do not give rise to any considerable irritation of the pericementum.

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* It is best to fill the pulp-chamber of the crown with a few drops of an antiseptic solution. The root-canal is to be pumped out by means of a nerve-needle introduced slowly and withdrawn rapidly, the solution being replaced at intervals by the syringe until the fluid remains free from turbidity. The antiseptic usually employed by me is a three per cent. solution of lysol or cresol (cresolum purum liquefactum, Nœrdlinger).

In cases where the root-canals are so narrow that they cannot be cleansed with delicate needles, their organic contents must necessarily be small in quantity, and afford but a scant soil for the development of organisms. Accordingly, only a small quantity of decomposed material finds an exit through the apex of the root, and pericementitis rarely occurs. This explains the occurrence of pericementitis affecting the gingival root of an upper molar, while at the same time the buccal root does not exhibit the slightest traces of disease.

Conditions essentially different from those just described obtain in cases where the pulp has preserved its vitality and is inflamed only in portions. In such cases the method universally followed is to cauterize with arsenious acid. Following Herbst's recommendation, cobaltine (scherbenkobalt)[†] and crude metallic arsenic have been frequently employed of late instead of the acid. The commercial proportions are apparently of varying strength, otherwise the complaints of different practitioners as to the uncertainty of the remedy are unintelligible. Cobaltine was in fact employed in the sixties by Atkinson, of New York, and introduced into Germany by Von Langsdorf in 1878. Herbst[‡] uses a paste of the grayish-black powder with carbolic acid and cocain, as when arsenious acid is employed.[||] My procedure is as follows: A small pledget of cotton is saturated with pure carbolic acid (I have recently substituted pure creasote for the acid), and as much arsenic in powder is taken up as seems requisite. A filling of Fletcher's artificial dentine is then placed above the cotton. My procedure agrees exactly with the recent recommendations of Miller. If the inflamed pulp is still covered by a thin layer of dentine, removal of which would cause severe suffering, I desist from all endeavors to completely lay bare the pulp, and place the cobaltine upon the dentine covering. After forty-eight hours, complete loss of sensibility of the devitalized pulp has been attained in every case thus far treated. Pain, moreover, has never, in my experience, followed the insertion of the filling. According to Miller's observations, the dreaded pain following the application of arsenious acid may be avoided in every instance, provided no pressure be exercised upon the tissue of the pulp. It is therefore, in my opinion, a matter of no importance whether arsenious acid or metallic arsenic be employed.*

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[*] A. Werner, "A Critical Examination of the Antiseptic Treatment of the Teeth." *Monatsschrift der Vereiner deutsch. Zahnkunstler*, Juni, Heft 1883.

[†] The so-called cobalt-glance, or bright white cobalt, which is a compound of cobalt arsenide and sulfide ($CoAs_2+CoS_2$).—ED. DENTAL COSMOS.

[‡] Herbst, "On the Treatment of Diseased Pulps." *Deutsche Monatsschrift f. Zahnheilk.*, 1892, pp. 352–356.

[||] Analysis of Herbst's cobalt preparation shows it to be devoid of cobalt, and composed solely of metallic arsenic and cocain hydrochlorate. See DENTAL COSMOS, March, 1893, p. 247.—ED. DENTAL COSMOS.

An important question presents itself in this connection : Is the united power of arsenic and carbolic acid or creasote as an antiseptic adequate not only to devitalize but also to sterilize a pulp inflamed and filled with microbes ? As regards pulpitis partialis, I believe I am in a position to give an affirmative reply in every case. I am at present unable to adduce positive proof of this, but inoculation from two cases of partial inflammation, devitalized by the remedy, showed the absence of germs. I hope to extend my researches upon this point at a subsequent time. Prior to my acquaintance with Herbst's method, I had been in the habit of treating cases of pulpitis partialis with borax, according to Baume. I subsequently substituted thymol in crystal for the borax.† I should certainly return to this remedy in case Herbst's method should, after further trial, prove unsatisfactory, —a result which, however, I do not anticipate.‡ At present, I follow Herbst's directions exactly, without the rubber-dam and without a permanent antiseptic. I employ tin as a covering ; this is inserted by means of a rotator shaped like an inverted cone. Careful notes are made of the cases so treated, and not a single failure has thus far come to my notice. Upon first thought, it seems incredible, in view of the entire neglect of all antiseptic measures, that good results can be attained ; nevertheless, the fact is readily explicable. Miller has, it is true, shown that the mouth may act as a most excellent incubator for all species of micro-organisms, but it must be remembered that this is but rarely the case among the better classes, who are accustomed to give proper attention to keeping the mouth clean. People of this class are wont to cleanse the mouth thoroughly before visiting the dentist. In operating without the rubber-dam, the saliva which may gain access to the field of operation has been recently secreted, and is therefore free from germs, unless it has become infected while traversing the mucous membrane of a dirty mouth. Moreover, the smooth surface of tin foil used in the operation will collect only a few harmless bacteria from the atmosphere, but no pathogenic germs, unless the operator is exceptionally careless.

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* Scherbenkobalt also contains a small and varying amount of arsenious acid. Its advantages over ordinary arsenical paste consist in its lesser degree of causticity, a circumstance especially advantageous where contact with the pulp cannot be avoided. The longer the medicament is allowed to remain, contact from without being excluded, the sooner does sterilization of the devitalized pulp occur. A filling of scherbenkobalt, protected by a well-fitting layer of zinc chlorid cement, may be safely left undisturbed from eight to fourteen days.

† The application of thymol in substance to the exposed pulp for the relief of pulpitis and conservation of the pulp was first recommended by Hartmann. See *Deutschen Monatsschrift f. Zahnheilk.*, vols. i and iv, 1892.—Ed. Dental Cosmos

‡ Thymol is, in my opinion, the most satisfactory antiseptic applicable in dentistry. Its anesthetic properties in cases of violent pulpitis are nothing less than marvelous. (Röse, "On the Use of Thymol in Pulpitis," *Vierteljahrsschrift f. Zahnh.*, 1893, H. 1, and Dental Cosmos, Jan., 1894, p. 41.)

In short, if we cover an aseptic root located in a clean mouth with carefully handled tin foil, we are entitled to expect a good result, in spite of contact with saliva. This condition is, of course, not always attainable, and I strongly advise the beginner, when making use of Herbst's method, to employ a rubber-dam, and, before inserting the tin, to cover the contents of the root with a few drops of some antiseptic solution (five per cent. lysol or cresol), as a certain preventive against the presence of air between the root contents and the tin. It is my custom to moisten the lower layers of the tin foil, likewise, with the antiseptic.*

I thereupon insert, directly upon the tin, amalgam, cement, or gold. According to experiments which I have made, it is only the superficial layers and the tin which are affected by the mercury of the amalgam. The walls of the pulp-chamber require, as a protection to the filling, some material impenetrable to bacteria, as the indispensable prerequisite for a good result, if Herbst's method be followed. Herbst certainly goes too far in believing that the tin alone assures such a condition. Dr. Schirmer, of Basel, covers the remains of the root contents with gutta-percha dissolved in chloroform, in place of tin, and with excellent results. The placing of the tin as above described can be done with such ease and rapidity that I see no reason for seeking other methods.

Herbst's method is thus seen to consist, essentially, in the avoidance of every antiseptic as a permanent filling, and in hermetically sealing the remains of the root-canals, previously converted into an aseptic mass. This distinguishes the method from that of Witzel's plan of amputation, introduced as early as 1874, in which powerful antiseptics are employed in the permanent filling. The methods of Witzel, Baume, and Herbst have this in common, that the root-pulp is rendered aseptic instead of attempting its removal, but is allowed to remain as the natural filling. All such methods should therefore be denominated "methods by amputation." Certain results are only to be looked for by these methods, if we are able to render the contents of the root aseptic prior to the insertion of the permanent filling. If this end has not been attained by the arsenic, if living germs are present in the apices of the roots, in cases of severe inflammation of the pulp (pulpitis gangrenosa and pulpitis purulenta), neither borax nor sublimate can prevent their migration into the periodontium. In such cases, complete removal of all organic remains is the only remedy. If this cannot be accomplished, sterilization by the employment of antiseptics in solution (lysol, cresol, or carbolic acid) can be more readily and rapidly accomplished than by the use of antiseptics for permanent filling. The ancient saw, "Corpora non agunt nisi fluida," has its application here also.

In mild cases of pulpitis, the germs are situated either only at a single focus within the crown-pulp, or they have spread along the central vessels and nerves for a little distance into the root. In all these cases—and they constitute by far the majority—two or three days' sojourn of arsenious acid or scherbenkobalt in combination with carbolic acid or cresol suffices for complete sterilization. In the amputation method, moreover, the inflamed tissue is usually removed as a whole, and there is therefore not the slightest reason for maltreating the aseptic contents of the root-canals with a strong permanent antiseptic filling. I shall not enter into the further history of the amputated pulp left behind. In spite of the undoubted fact that cases do occur where the contents of the roots preserve their vitality for a considerable period, it may be safely assumed that absorption, sooner or later, is the rule. Such an event is certainly not promoted by impregnation of the pulp with strong antiseptics.

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* After perfect deposition of this layer, I simply dry up the redundant moisture, and then insert a second layer in the dry state.

Endogenous infection of the periosteum from the blood is likewise unpreventable by the insertion of a powerful antiseptic filling. It is my opinion that the antiseptic itself causes such a degree of irritation as to give rise to pericementitis in many cases. If, nevertheless, a permanent antiseptic filling is to be employed, the substance selected should be such as will cause the least irritation to the tissues. Pure thymol best fulfills these conditions. This agent was also used by Miller in combination with corrosive sublimate.

In conclusion, I would call upon our colleagues to make unbiased trial of Herst's method, exercising great cleanliness, making exact diagnoses, and rejecting unsuitable cases. Failures can be as little avoided in a certain proportion of cases by this method as by any other, especially if it has to be applied in anemic and weakly subjects. If good results are to be attained, the indispensable prerequisite is thorough removal of the crown-pulp and the superior portion of the root contents with the spoon excavator and round bur. I am in the habit of drilling away the innermost layer of dentine bounding the pulp-chamber. In case considerable portions of the pulp are allowed to remain, there is danger that the tin filling will not assure hermetic sealing, and hence a way for infection from without may be left open. The possibility of infection of even a healthy pulp, especially in weakly subjects, being an established fact, of itself furnishes an additional reason for the removal of the larger portion of the diseased tissue, in order that the narrow threads within the root-canals may be rapidly absorbed. The method of disinfection of the pulp-chamber given above, with saturation of the lowermost layers of the tin filling with five per cent. solution of lysol, or other similar substance, is, in my opinion, of the greatest importance, inasmuch as infection from the instruments will not be avoidable in every case, in spite of the greatest care. Such infection can, however, not occur if the above simple antiseptic precautions are carried out.

DR. F. O. JACOBS CONTRA PROFESSOR DR. W. D. MILLER.

BY R. H. HOFHEINZ, D.D.S., ROCHESTER, N. Y.

In the DENTAL COSMOS for July, 1893, Dr. Jacobs reproduced a portion of an article published by him in *The Microscope* for June, 1889, and in the DENTAL COSMOS for October, 1889, the subject being, "Dr. Miller's Theory of Dental Caries."

Dr. Jacobs characterizes this communication on the "Agency of

Micro-Organisms in Decay of Teeth'' (DENTAL COSMOS, Jan., 1883) as '' the most inaccurate article I ever knew to be published in the name of science.''

It would be a superfluous task to add my humble part to the fame of Professor Miller as a scientist, but I cannot refrain from copying a few expressions from the best men and journals of Europe on this article, and its subsequent ones, finally issued in his famous work, '' Micro-Organisms of the Human Mouth.''

Professors Koch and Rübner, Dr. Günther, and others, in their respective lectures on bacteria of the mouth, pronounce Professor Miller's work '' the most excellent one written on the subject.''

The *Münchner Medizinische Wochenschrift*, August 13, 1889, says, '' Not only every dentist but every medical man should possess a copy of this excellent book, which is a work of epoch-making character.''

The *Deutsche Monatsschrift für Zahnheilkunde* says, '' It is a work of the first rank, and equal in value to Wedl's 'Pathologie der Zâhne.' The author by his splendid original researches has created a special branch of science.''

The *Deutsche Medizinische Wochenschrift* says, '' The bacteriologist can certainly not afford to be without this valuable work, and to the dentist it is a *duty* to acquaint himself with the contents thereof.''

The *Revue de Medicine*, Paris, August 10, 1889, says, '' This work of Dr. Miller is a magnificent one, and we cannot recommend it too highly, not only to the specialist, but also to the medical practitioner.''

The *Journal für Zahnheilkunde*, Berlin, 1889, says, '' Like the researches of Lister, which have formed a milestone in the progress of conservative surgery, the work of Miller is equally great in its importance, not only to the dentist, but also to the physician.''

The views of competent American critics are known to the readers of the COSMOS, and I could add many more of the same nature.

Professor Miller, by ignoring the article of Dr. Jacobs, has furnished the profession his answer. I think it is the duty of some one of our profession, however, to reply to the said article, for the reason that if a journal like the DENTAL COSMOS publishes a criticism, particularly of a polemic nature, the majority of its readers are liable to accept the verdict without question, and I am strongly inclined to think that the impression thus received would not be quite in accord with the facts of the case.

The article in question was the first one that appeared from the pen of Professor Miller in connection with dental caries. If Professor Miller would rewrite it at the present time, he would probably make some changes in the same ; and what progressive man would not ? A science as young as that of bacteriology receives many valuable contributions in the course of eleven years.

Dr. Jacobs's first argument is the following : '' Here is one of Dr. Miller's experiments : He places a freshly extracted tooth in concentrated carbolic acid, and after a space of one hour finds it quivering with living organisms. This is certainly the work of his imagination. Who could expect to find signs of life in any organism after having been drowned in carbolic acid ?''

Dr. Miller has said nothing about drowning organisms. The fact is perfectly well established that a tooth may remain a full hour in concentrated carbolic acid and still contain living organisms. Professor Miller has even found living bacteria in teeth which had been in the solution named for one and one-half hours. The experiments on that subject are reported in the COSMOS for May, 1891, and do not admit of any doubt. It should be clear to every one that it is not a question of drowning the bacteria in carbolic acid, but of the penetrability of carious dentine for antiseptics.

The second objectionable point is found in the following sentence: "The leptothrix threads contain granules of starch, and give, consequently, with an acid solution of iodin, a blue to violet color." To this Dr. Jacobs replies: "He thought he had discovered starch in his bacteria on account of a blue tint produced by treating his preparations with sulfuric acid." It is evident that Dr. Jacobs confused Professor Miller's sentence, which is certainly plain enough. He did not say that the bacteria contained starch because of the blue tint, but that they gave the tint because they contained starch, which is quite a different thing. Professor Miller simply referred to a well-known fact without comment. It was unnecessary for Dr. Jacobs to dwell on the action of sulfuric acid on cellulose, since Professor Miller does not mention the use of this acid, but distinctly speaks of *acetic* acid.

Whether or not bacteria ever contain starch is a question which does not affect the integrity of Professor Miller's article.

Flügge ("Micro-Organisms," page 428) speaks of granulose-like substances which appear in Bacillus butyricus, Vibrio rugula, Bacillus Pasteurianus (Hansen) and Leptothrix buccalis. De Barry ("Vorlesungen über Bacterien") speaks of the starch reaction. Günther ("Bacteriologie") says the protoplasm of many kinds of bacteria contains starch. Prazmowski observed a direct resorption of starch by Clostrydium butyricum. Van Ingham (*Comptes rendus*, lxxxix) found that Bacillus butyricus possessed the power of producing amorphous starch in its protoplasm.

We now come to the third objectionable statement that Dr. Jacobs has found. It reads thus: "I have in my investigations met with only one kind of fungus which beyond all doubt has the power of boring directly into sound dentine. This is not, however, a spaltpilz, but a sprosspilz."* Prof. Miller gave a drawing of this organism in Fig. 5, and called it Saccharomyces mycoderma. To this Dr. Jacobs replies: "He also claimed to have seen (in his mind's eye) bacteria boring directly into sound dentine, generating acid at the growing end. This statement I consider simply ridiculous. It would be interesting to know how he succeeded in distinguishing a growing extremity from the one that does not grow," etc.

I beg to call the critic's attention to the fact that no mention is anywhere made of bacteria boring their way into solid dentine. Saccharomyces mycoderma is not a bacterium, and one can usually distinguish its growing end very readily.

It is widely known that certain low organisms belonging to the Thallophytæ have the power of boring canals in hard substances like bone, dentine, shells, etc. Roux ("Ueber eine im Knochen-lebende Gruppe von Fadenpilzen,"—*Zeitschrift für wissenchaftliche Zoologie*, Bd. xlv, 1886, S. 227) describes canals in a piece of a rib of Rhytina

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* A spaltpilz reproduces itself by division, a sprosspilz by budding.

Stelleri formed by a fungus which he designates as Mycelitis ossifragus. Schäffer reported similar observations on bones as well as on teeth (*Sitzungsbericht der math. naturwissenschaftlichen Classe der kais. Akademie der Wissenschaften*, Bd. xcviii, Abth. iii, 1889, and Bd. xcix, Abth. iii, 1891). He named the canals in the teeth Roux's canals, though Professor Miller described them in Klebs's *Archiv für experimentelle Pathologie und Pharmakologie*, Bd. xvi, 1882,—*i.e.*, five years before Roux. Smreker is reported to have found similar canals in teeth which had lain in water. Schaeffer was of the opinion that the canals were produced by algæ, but he is, I believe, not supported by other observers.

Further confirmation of Professor Miller's observations relating to the teeth were made by Galippe (*Deutsche Monatsschrift für Zahnheilkunde*, 1889, S. 128) and Dr. Gerhard Rudas (*Odontoscope*, March-April, 1893), as well as by Tomes and Mummery (Transactions of the Odontological Society of Great Britain, Vol. xxiv, No. 4, 1892).

With all due regard to Dr. Jacobs, I do not believe that he has given this matter as careful attention and study as the subject, and in particular the writer, deserved. Our views may differ from those of Professor Miller, but his scientific researches have been of such incalculable value to our profession, he has done so much for the scientific development of the same, that whoever undertakes to criticise his work must at least be thorough in the attempt, and should endeavor to obtain that objectivity so indispensable to a fair critic.

Criticism is the greatest stimulation in every phase of life ; but to perform its good function it must be based upon a correct knowledge of the subject, it must be free from all polemic nature, and must rise above the writer's feelings.

DIFFERENT METHODS OF REPLACING FACINGS ON IRREMOVABLE CROWNS AND BRIDGES.

BY WM. E. CHRISTENSEN, D.D.S., PHILADELPHIA, PA.

In describing the following methods of replacing broken facings on irremovable dentures, I do not claim originality for any of them. It may be that all of them are old and well known to most of the readers of dental literature. However, when I recall the distress I felt when, on the first occasion, I believed myself obliged to remove a well-set bridge, and did so, in order to renew a broken facing, I shall consider my effort repaid if only a single bridge be saved from removal through these descriptions.

To dwell upon the merits and defects of crown- and bridge-work in general, and paint both extremes with gaudy colors, would be to do as nearly every writer has done who in recent years has described complicated methods of making removable bridge-work, and claimed that removable crowns and bridges are the only kind which ought to be done. With all respect for the efforts of these investigators, I believe their methods have found but very little adoption with the profession in general, and naturally so, because there is always a certain limit to be considered, not only with regard to the patient's pocketbook, but also as to what a patient may be inclined to submit himself to in the dental chair, and it is but proper that there must also be a corresponding limit for the dentist's efforts, time, and labor. All in all, I believe crown- and bridge-work, as the term is generally understood, and as it has been generally applied by the greatest number of conscientious, common-sense dentists, has been a blessing, as well to patients as to the profession. We all know its merits and its faults. I do not believe we are at all able to reach perfection in the full meaning of the word, neither in dentistry nor in any condition in life—*ergo*, we do our best with what is given to us as useful, thought not perfect, though it is, of course, our duty to struggle toward perfection, and to try to come as close to a realization of the term as possible ; and this, I think, is what we daily do with crown- and bridge-work.

One of the disastrous sequels of this kind of work is that accident, which, I dare say, has occurred in the experience of every dentist who applies it, and which will strike every one in the same unpleasant way, when the patient comes back with a facing broken off from a "permanently" inserted bridge or Richmond crown. As bearing upon this, I wish to describe the following procedures for mending such cases without removing the bridge or crown from its position, and which I have applied in suitable cases.

The first of these methods was suggested to me by my esteemed teacher, Professor Edwin T. Darby, and consists in simply inserting the pins of a facing, which has been ground to fit the exposed backing of the old tooth, into a socket in the backing, which can be made with an ordinary bur or drill. Figs. 1, 2, and 3 show the idea. A facing with long pins is selected, and the ends bent to form resisting points, or small pieces of metal may be soldered to the ends for the same purpose. The sockets must be cone-shaped, and the tooth must be set with cement or amalgam, which will hold it firmly. When the size and shape of the sockets has been made in the right proportion to the length and the heads of the pins, I should consider this attachment stronger than the tooth, and rather expect the tooth to break than to come out of the sockets. Dr. Darby has applied it successfully even in cases of front teeth. I, however, should deem it better applied, and by all means the easiest and the right thing to do, in cases of molars and bicuspids. When we have to deal with the broken facing of a front tooth (and it is here the accident will occur most frequently), the backing of which will seldom be found to be more than one-twentieth to one-twelfth of an inch thick, I should consider this method less reliable, and should prefer to follow one of the following two methods, according to whether the broken facing has been one with the pins arranged lengthwise or in transverse position.

FIG. 1.

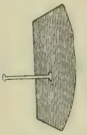


FIG. 2.

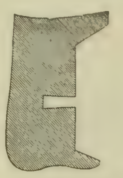
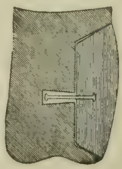


FIG. 3.



Supposing the case to be an incisor, Richmond crown, and the broken facing having been one with the pins in longitudinal position, the remaining parts will appear as shown in Figs. 4 and 5. We make a second backing of platinum plate, gauge No. 30, to fit closely to the old one, and make a ridge or slide to slide over the heads of the pins, as shown in Figs. 6, 7, and 8. The slide must be soldered to the backing with twenty-four-carat gold, and we have then a base ready for baking in the Downie crown furnace a facing to fit the case. The slide of the facing just described can be made to fit over the pins of the old backing so as to hold it without any cement or amalgam ; if one of these be applied in addition, I believe the whole a great deal stronger, and less liable to break off again, than a facing soldered on.

FIG. 4.

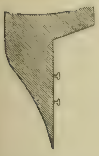


FIG. 5.

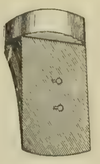


FIG. 6.

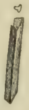


FIG. 7.

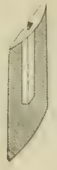
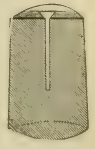


FIG. 8.



This method, however, cannot be applied if the broken facing has been one made with the pins in transverse position. When such a case was shown to me some time ago, on a very firmly inserted, beautifully fitting ten-teeth bridge, I at first did not know what to do with it, the Darby method having already been tried on it without success, the backing being decidedly too thin for this method. However, by thinking, I devised a method of fixing it in a simple and easy way. The tooth was a dummy cuspid ; the empty backing appeared as shown in Fig. 9. The pins were cut off and two holes drilled as in the Darby method ; afterward, with a fissure bur, I cut the holes down to the cutting-edge of the backing, as Fig. 10 shows. In this way I was able to make a plain facing slide in and grind it to fit the old backing. To hold it in position, I then put the ends of the pins through a piece of platinum plate, No. 30, and, keeping the parts together with sticky wax, pressed the plate in position to fit tightly to the lingual wall of the backing, after which I invested it in plaster and soldered the plate to the pins with twenty-four-carat gold, when it appeared as Fig. 11 shows. After having set it with amalgam made with an excess of mercury, I burnished the end of the plate in over the upper edge of the old backing, so that a diagram of the whole would look like Fig. 12. If the crown had not been a dummy crown, I could not have done this last thing. I should then have roughened the back side of the backing and the inside of the platinum plate, which, together with cement or amalgam, would have kept it firmly ; in fact, when I tried the tooth, without any amalgam between the

FIG. 9.

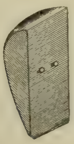


FIG. 10.

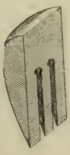


FIG. 11.

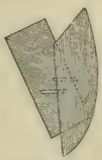
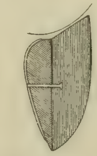


FIG. 12.



parts, and the end of the plate not yet bent in, it held so tightly that I could hardly remove it again.

Different cases will always require more or less ingenuity to be conjoined with the operator's skill. If these descriptions may help to show some one the way to follow in similar cases, my object in writing them has been reached.

A PRACTICAL CASE OF BRIDGE-WORK.

BY F. M. WILLIS, D.D.S., CORNING, N. Y.

A LARGE and varied experience in both permanent and removable bridge-work has demonstrated the fact that for small cases of three, four, or five teeth, where the abutments are good, a permanently set bridge is more satisfactory to both dentist and patient than any removable work. As a general thing, patients do not like a bridge that they can remove from the mouth; they prefer to have it there solid and immovable.

FIG. 1.

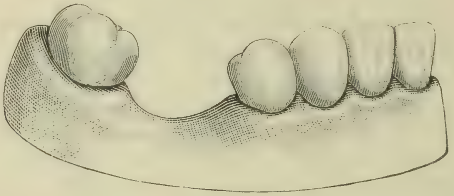
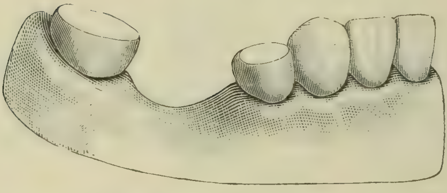
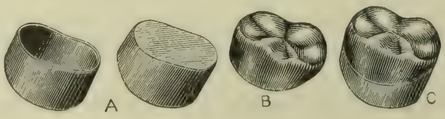


FIG. 2.



The case here described is that of a young physician who had the right lower second bicuspid and the first and third molars extracted soon after they were erupted. The first bicuspid leans backward considerably, and the second molar leans both forward and inward toward the tongue (see Fig. 1). Owing to the fact that the grinding-surfaces of these two teeth are so much nearer together than their cervical portions, it was impossible to make a bridge in the ordinary manner without greatly mutilating the teeth. So the grinding-surfaces of the teeth to be used as abutments were ground enough to

FIG. 3.



allow a good thickness of gold on the occluding surfaces of the gold crowns (Fig. 2). A band of gold was accurately fitted around the molar, extending just under the gum-margin. The top of the band was ground off even with the top of the tooth, then removed, and a flat top of thin gold or platinum soldered to it (Fig. 3, *a*). Before this crown was placed back on the tooth, another crown was fitted over it with cusps to articulate with the upper tooth. Instead of letting the band of this outside crown extend to the gum-margin all around the tooth, it was trimmed away at the anterior portion nearly to the grinding-surface, and sloped off in such a way that the sides and posterior portion extended to within a line of the gum-margin (Fig. 3, *b*). These crowns, the one inside the other (Fig. 3, *c*), were placed on the molar, then a crown with edges fitting accurately under the gum was made in the ordinary way for the bicuspid.

The side of the mouth was filled with plaster, and the patient requested to close the jaws together. When hard, the plaster was removed, bringing away the bicuspid crown and *outside* crown of the molar. Nothing further was done with the inside crown for the molar until the bridge was finished. Plaster and marble-dust was poured into the crowns and impression, and into the upper side of this impression a little of Melotte's fusible metal was poured. The ends of one or two short pins were heated, and the hot end set in the metal, letting the other end stand up so as to hold in the plaster. The whole was placed on an articulator, and the pouring completed with plaster.

FIG. 4.

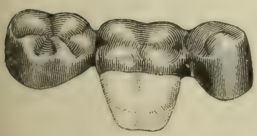
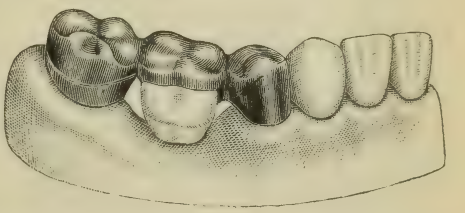


FIG. 5.



The object of having the upper teeth of metal is to have them solid to work against, so then when the piece is finished the articulation will be perfect. Any one who has tried this method of getting an articulation will never again make the teeth of plaster in the usual way.

Although two teeth had been extracted from the space, the remaining teeth had so leaned toward one another that now there was room for only one molar. A porcelain facing was selected, long enough to rest solidly on the gum, to aid which the plaster on the model was scraped away a little immediately under the molar. The molar facing was backed up with gold or platinum, and the bridge soldered and finished. In finishing up the bridge, care was taken to polish the lower edges of the gold crowns down to a feather edge. The inside crown for the molar was polished and cemented onto the molar. While the cement was still soft, the bridge was placed in position to see if the adjustments were right and the articulation perfect. After the cement was thoroughly hardened, the bridge was removed. It should come away easily, owing to the fact that the anterior part of the band of the molar crown has been cut away as described.

The parts were next dried and the bridge securely cemented to place. Fig. 4 shows the completed bridge, and Fig. 5 the finished case.

Although the outside molar crown does not entirely cover the inside crown, it will remain securely cemented ; for every practitioner knows how much better cement will hold between two pieces of gold than it will between gold and tooth-structure.

The principle set forth can be varied to suit different cases. Sometimes it might be found more convenient to make the partial cap for the bicuspid, and cap the molar in the usual way. Or, if both teeth are very irregular, the partial caps may be used for both abutments.

By this method permanent and satisfactory bridges can be made for irregular cases without mutilating the teeth to any considerable extent.

CONGENITAL FISSURES OF THE UPPER LIP AND THE VAULT OF THE MOUTH.

BY JOHN S. MARSHALL, M.D., CHICAGO, ILL.

(Read before the annual meeting of the Tennessee Dental Association, at Nashville, March 26. 1894.)

MR. PRESIDENT AND MEMBERS OF THE SOCIETY : Fissures of the upper lip, superior maxillary bones, and soft palate are the result of arrested development of the parts involved, and consequent failure of these parts to form a junction and coalesce. The fissure may be of any degree, from a slight notch in the lip or a bifurcation of the uvula, to a complete cleft of the lip, alveolar process, palatine process, palate bones and velum palati, or a double cleft of the lip and bony palate and almost entire absence of the velum.

The slightest degree of fissure is represented by a superficial notch or scar in the upper lip, while, in the other direction, by a mere suggestion of a bifurcation of the uvula. The most common forms are fissures of the lip and the velum. Fissures of the lip often occur without cleft of the velum or maxillary bones, while, on the other hand, cleft of the velum frequently occurs without fissure of the lip ; the cleft in the palate may even extend forward to the alveolar process and still not be associated with a fissure of the lip, but where the fissure extends through the alveolar process the writer has always found it associated with a fissure of the lip. "In some rare instances, however, the alveolar process alone may be fissured."*

Fissures of the lip and palate may be *unilateral* or *bilateral*, but are most frequently unilateral, and most commonly upon the left side.

Bilateral fissure of the lip and maxillary bones with median cleft of the soft palate occasionally occurs. The writer has treated four cases of this character associated with extensive protrusion of the intermaxillary bones. In each of these cases there was no union of the palate process with the vomer on either side.

In exceptional cases, the fissures may extend upward on either side of the nose, or may extend backward, involving the base of the skull. Median fissure is very rare. Salter† mentions three cases : one described by Rokitansky, one met in his own practice, and a specimen in the Museum of the Royal College of Surgeons, London.

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*Coles's "Deformities of the Mouth."

†"Dental Pathology and Surgery," page 372.

Occasionally there is an entire absence of the intermaxillary bones, and, consequently, of the incisors.

In Salter's case of median fissure, the right intermaxillary bone was slightly deficient, with absence of the central incisor ; the lateral, however, was in position, standing close to the cuspid and separated from the left central by a deep fissure.

A. Broca* has reported quite recently a case of complete fissure of the upper lip, with absence of the median tubercle.

Median fissure of the face is more often associated with the lower lip and inferior maxilla than with the upper portion of the face. A remarkable case of this character is reported by A. Wölfler† as occurring in an infant that came under his notice when it was twenty-three days old, in which the lower lip was cleft, the inferior maxilla separated upon the median line, but held together by a cicatricial band, the fissure extending downward into the neck to the suprasternal fossa ; the anterior portion of the tongue was likewise divided into halves upon the median line. These deformities were successfully corrected by surgical operations.

Sometimes there are other defects of development associated in the individual with fissure of the palate, due to the same general causes. These defects are occasionally of an extreme character and serious nature, and interfere with the performance of the natural functions of the body.

ETIOLOGY.

The causes of hare-lip and cleft palate are to be sought for among the prenatal influences, and are generally conceded to be faults in the developmental process. These influences, to be operative, must occur prior to the tenth week after conception. The formation of the maxilla begins at a very early period of intra-uterine life,—viz, at about the twenty-eighth day,—by the development of four tiny buds, tubercles, or processes near the central portion of that surface of the rudimentary head which is destined to form the face, which are denominated the superior or frontal processes or tubercles and the lateral or oblique maxillary processes or tubercles. The superior processes elongate downward and at the same time approach each other toward the median line, where they finally coalesce to form the intermaxillary bones and the central portion of the upper lip. The lateral processes likewise elongate and approach each other toward the median line, where they finally meet the superior processes and unite with them, thus forming the lateral halves of the superior maxillary bone, palate bones, the cheeks, and lateral portions of the upper lip and the velum palati.

Non-Union of Superior and Lateral Processes.—The frontal processes occasionally fail to unite upon the median line ; but it is not uncommon for the oblique maxillary processes of either side to fail to unite with the frontal processes, and occasionally both sides fail ; thus in the former producing a fissure upon the right or left side, and in the latter a double fissure.

Fissures of the lip are the result of the same causes,—viz, failure of the central portion of the lip to unite with the lateral portions,—while clefts in the velum palati are the result of a non-union of the lateral halves with its fellow upon the median line.

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* *Bulletin de la Société anatomique*, Paris, October, 1891.

† *Centralblatt für Chirurgie*, Leipzig, May 28, 1892.

Arrested Development.—In many cases there is a deficiency in the various tissues which go to make up the complete superior maxillary bone, palate bones, lip, and soft palate, hence the primary cause would seem to be an arrestation of the developmental process in these particular parts. The writer has seen several cases in which the velum palati especially was very deficient and only rudimentary in character, while in others there was a marked deficiency in all of the tissues of these parts, leaving a broad, yawning aperture.

The extent of the fissure will depend very largely, if not entirely, upon the time at which the arrestation of development occurred ; the earlier the period the more extensive the cleft, and *vice versa.*

At about the fortieth day after conception, the superior and lateral processes have united, and by the end of the tenth week the vault of the mouth has been completed by the union of the velum palati and uvula through their entire length ; this process begins at the anterior aspect and progresses backward, the uvula being the last portion to unite.

In certain cases of hare-lip and cleft palate there is a sufficiency of tissue, and in which the only fault, seemingly, was a failure of union of the parts at the proper time. Surgical treatment of these cases in the early months of infancy many times secures normal position of the parts and a complete restoration of function.

The fundamental influences, however, which underlie the causation of these defects in development have not yet been reached, and all theories which have so far been advanced to account for them belong to the realm of speculation and conjecture.

Faulty Nutrition.—Some have thought it to be caused by a fault in the diet, through the exclusion of meat as an article of food, or the introduction of an insufficient quantity of calcium phosphates into the system of the mother during gestation.

As an argument in favor of this view, it might be stated that the lions in the Zoological Gardens of London were fed for several years upon meat from large animals, having bones too large for them to crush and swallow ; this was followed by the birth of cubs with cleft palate,—ninety-nine per cent.,—who lived but a short time, from their inability to suckle. The lions were then occasionally given a small animal, like a goat or sheep, the bones of which were readily crushed by their teeth, and the young afterward born had perfectly formed palates. At the Zoological Garden of Dublin a like experience was encountered, and was counteracted by feeding the pregnant lions with ground bones and foods containing calcium phosphates. Dr. J. Ewing Mears* reports the same condition prevailing among the offspring of the lions at the Philadelphia Zoological Garden.

Neither of these arguments is entitled to very much weight, for the reason that it is a fairly well-established fact that union of the superior and lateral maxillary processes in the human subject is not dependent upon ossification of these structures, for union or coalescence takes place in advance of ossification, and this process is not completed along the line of the sutures until some time after birth.

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* *New York Medical Journal.*

It is also a well-established physiological law, that in the pregnant woman, if there is not a sufficient amount of calcium salts ingested to support the extra demands made upon the system for the proper development of the osseous frame-work of the fetus, and to *recoup* the waste in her own tissues, the material already stored up in her body is drawn upon to supply the demands of the fetus.

Changes in the constituent elements of the bones are of common occurrence as a result of malnutrition. Dalton says, "Next to the chlorid of sodium, the phosphate of calcium is considered the most important ingredient of the body. It is met with universally in every tissue and every fluid," and whenever the nutrition of the bone during life is interfered with from any pathological cause, so that its phosphate of calcium becomes deficient in amount, a softening of the osseous tissue is the consequence, by which the bone yields to external pressure and becomes more or less distorted."* In fractures occurring during gestation, union is often delayed, sometimes until after delivery.

Padieu describes a case in which fractures of the tibia and fibula occurred nine days after the suppression of the menses, and union was delayed until the end of gestation. The process of union began ten days after delivery, and was completed at the end of a month.

The pelvis, looked upon at all other times as a comparatively solid framework, frequently becomes relaxed in its articulations during pregnancy, so that the sacro-iliac and pubic joints become movable.

Many women are in the habit of discarding from their aliment during pregnancy all those foods which contain an abundance of calcium salts, and restrict themselves, as nearly as possible, to a fruit diet, believing that by such practice the bones of the child will be imperfectly calcified, and thus parturition be robbed of much of its suffering. There is, however no scientific evidence that such a result is obtained, while on the other hand, as in those cases affected with hyperæmesis, though the child when born may be small and much emaciated, it has the appearance of being properly formed, and its bones as dense as in the majority of normal pregnancies.

Heredity.—The question of hereditary influence is one that calls for more than a passing notice, for, *a priori*, it would strike one as likely to be an important factor in the production of defects of development. The facts, however, which have been deduced are not of sufficient strength to establish it, though a few isolated instances have been reported in which there seemed to be an indirect inherited tendency in a certain family to produce offspring with this deformity.

Oakley Coles † mentions two families in which there was a marked tendency in this direction. In the first family there were three with cleft palate, one seventeen years of age, another thirty, and the third thirty-five ; the first and last were ladies ; the gentleman, who is married, has a family without a single instance of their father's deformity. The second family was composed of five children, two of whom had fissure of the lip and palate ; the first child was born perfect, the second had single hare-lip and cleft palate, the third child was perfect, the fourth had double hare-lip and cleft palate, and the last child was perfect. The maternal grandmother also had cleft palate.

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* John S. Marshall, "The Oral Cavity of Pregnant Women," *Journal of the American Medical Association*, 1889.

† "Deformities of the Mouth," page 28.

Lawson Tait* believes that heredity is a strong factor in the production of this deformity, and says he has known it to skip three generations and then appear in a hereditary form.

E. F. Plicque† reports a case of hare-lip in a female in which he thinks the deformity is undoubtedly inherited. The family history is as follows: Both parents of the patient were entirely free from any congenital defect. One of her father's brothers had supernumerary fingers. A brother of her mother was born with hare-lip, but both of his children were free from the deformity. His sister, the mother of the patient, has given birth to nine children, five of whom had hare-lip but no palatal defect. Another sister of the patient's mother who was free from congenital defect gave birth to two children with hare-lip and cleft palate of an uncommonly severe type. A brother and a sister of the patient, both of whom had congenital hare-lip, had married, but neither of their five children had any sign of the defect.

Manley‡ says in all of his cases there was either a history of heredity or of maternal impression.

The writer recently operated upon a child six months old with double fissure of the upper lip and hard palate, with protrusion of the intermaxillary bones and only rudimentary velum, this being the second child born of the same parents, in whom the tendency was marked. The first child was born with fissure of the left side of the upper lip; the second child was born perfect, and the third child with the defect first described. There was no history of similar defects of development in the family of either of the parents.

Maternal Impressions.—It is interesting to note in this connection that most women who are so unfortunate as to give birth to deformed children, especially those with deformities of the face and mouth, feel very confident that it is the result of maternal impressions induced by fright, the sight or knowledge of a like deformity, etc. How much, if any, there may be of scientific truth in this popular notion, the writer is not prepared to say, more than that in all popular notions there is generally somewhere hidden away a kernel of truth. When we know more about the influences which the nervous system exerts over cell-life, the effects of the physical and mental conditions of the parents at the time of conception, and of the female parent during gestation, we shall be better able to consider the question from a scientific standpoint. Till then it would be mere speculation.

PROGNOSIS.

Most of the fissures and perforations of the hard palate are susceptible of radical cure by plastic surgical operations; the exceptions being those cases where there is marked deficiency in development or loss of tissue, and even in these there is reason to hope that the operation of transplanting new tissue from some adjacent locality will be so perfected as to become not only feasible as an operation, but successful in re-establishing the functions of the parts. In clefts of the velum palati, where the fissure is very wide and the deficiency in tissue is considerable, it is better to depend upon the artificial velum, rather than to attempt a cure by surgical measures ; for unless the velum can be restored to its normal length, so as to perfectly close the naso-pharyngeal opening, the operation would be a failure, for restoration of function is the main object in view.

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* *British and Foreign Medico-Chirurgical Review*, July, 1870.

† *Le progrès medicale*, Paris, 1891.

‡ *New York Medical Journal*, 1891.

The enthusiasm of the surgeon has many times carried him beyond the limits of a wise conservatism in the treatment of these cases, especially in operations upon the velum, with the natural result, failure. Consequently there are those who deny all attempts at cure by a surgical procedure, and maintain that in all cases mechanical appliances accomplish the best results in restoring the functions of the parts. A wise conservatism in both directions will, in the writer's opinion, give the best results in the individual case, for in no department of surgery is good judgment of more value to the patient.

Experience has taught the writer that skillful operations for closure of fissures of the palate, when performed during the early months of infancy, are more successful in restoring the functions of deglutition and articulation than when postponed, as is generally advised, until after the eruption of the deciduous teeth, or even as late as the fifteenth year. In order to obtain the best results, the operation should be completed before the child begins the first attempt at articulate speech. When delayed until after speech has been acquired, it is much more difficult to overcome the peculiar nasal tone that always accompanies the voice in persons with perforations or clefts of the bony palate or velum. Another factor in favor of early operation is the facility and comparative safety with which infants can be brought under the control of anesthetics, and the ease with which anesthesia can be maintained, and this is a great *desideratum* in all operations upon the mouth. Chloroform has the preference with the writer. In complete clefts of the superior lip and maxilla, there is a noticeable broadening of the face upon the affected side ; the distance from the median line of the apex of the nose to the antero-inferior angle of the malar bone is greater than upon the perfect side, and there is also accompanying this a decided spreading out and flattening of the ala of the nose. When the lip has not been closed, this broadening of the face and flattening of the ala of the nose increase with the growth of the individual. On the other hand, in those cases where the lip has been closed early, this widening is not only prevented, but there seems to be a slight narrowing of the cleft, due, no doubt, to the muscular contraction of the united lip. An early operation should therefore be recommended for the closure of the lip, and, where the strength of the child will permit, of the fissure of the bony palate and velum as well, provided the condition of the velum gives promise of successful restoration of function. A second operation for the closure of the velum can be done a few months later, if the condition of the child is not favorable for such procedure at the time of closing the fissure in the hard palate.

OPERATION.

Billroth * has recently modified the Langenbeck operation for closing fissure of the hard palate and velum, by approximating the internal wings of the sphenoid. This he accomplishes by dividing the mucous membrane at the sides of the velum, and fracturing the bone with a chisel. The mucous membrane is then utilized to close the cleft. His object is to do away with the necessity of dividing the muscles of the velum, particularly the circular or sphincter muscle which surrounds the naso-pharyngeal opening, and which has its anterior fibers in the velum palati.

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* *Wiener Medizinische Medicin*, 1890.

Rotter,* of Munich, describes an interesting case of a child six years old, upon whom he had operated previously by the Langenbeck method for an uncommonly wide fissure. The muco-periosteal flaps had united upon the median lines by first intention through their entire length, but left an opening upon the left side near the teeth, about four-tenths of an inch in width, giving free communication between the mouth and nasal cavity. To close this opening, he raised a flap of skin from the forehead, having a long pedicle attached, and the gap in the forehead was immediately closed with sutures. He then placed upon the raw surface of the flap numerous epidermal grafts, after the method of Thiersch, placed the flap against the forehead with the raw surface undermost, and held it in position by a bandage.

At the end of eight days the grafts had taken, and the flap was covered with skin upon both sides. The next steps were to lengthen the incision along the right side of the nose to the cleft in the lip, raise the right ala of the nose, freshen the edges of the opening in the palate, stitch the flap into position, close the fissure in the lip, and replace the ala of the nose.

The case was successful, and Rotter exhibited the child two years later to the Congress of German Surgeons. One of the remarkable facts in the case was that, though the flap was covered upon both sides with skin, the moisture in which it was constantly bathed seemed to have no deleterious effect upon it.

Rotter states that only two other cases are on record in which tissues had been transplanted for a like purpose from other locations than the palate itself; the first by Blaisus, the second by Thiersch.

Christian Fenger,† of Chicago, has lately devised a new operation for hare-lip, which consists, essentially, of utilizing the parings of the fissure to lengthen the border of the lip, splitting the edges of the flaps and uniting the edges of the mucous membrane and the skin by separate lines of sutures, this part being similar to the operation of Tait for uniting the lacerated perineum, and also of Marcey's operation for closing the velum palati.

Truman W. Brophy, of Chicago, has recently devised a new method of approximating the edges of fissures of the palate, which is unique and original, and for which he claims a decided advantage over other operations.‡

The method consists substantially in passing two double silver-wire sutures through the superior maxillary bone, within the mouth; the posterior one inserted just *behind* the malar process and high enough to pass over the palate plate of the bone, emerging at the same point upon the opposite side; the anterior one is passed through the bone just in *front* of the malar process. A lead button having two eye-holes is threaded upon the wire and the ends twisted together. The edges of the cleft having been previously freshened, the wires are twisted until the edges of the cleft are brought together. If the resistance is such that the edges do not readily approximate, the malar process is divided on either side by the aid of a heavy scalpel. The edges of the cleft are united by sutures in the usual way.

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* *Munchener Medicinische Wochenschrift*, 1890.

† *Journal American Medical Association*, 1893.

‡ Read before the World's Columbian Dental Congress, 1893.

This operation would seem to be valuable if performed during the early months of infancy, while the bones are still imperfectly calcified, in those cases where the deficiency of tissue is slight, and the edges of the fissure but moderately separated ; but where the cleft is wide and the deficiency of bony tissue considerable, it might succeed in closing the defect in the palate, but it would establish another deformity equally grave in character,—viz, partial or complete stenosis of the nasal passage of the affected side. It is to be presumed, therefore, that Dr. Brophy would not advise this operation, only in selected cases where this condition could not result.

In the cases first mentioned it would seem to have an advantage over the Langenbeck muco-periosteal operation ; but in fissures of any considerable width, or in double fissure, the latter procedure would be preferable.

In cases of single cleft of the lip and palate the writer advises the closing of the lip as soon after birth as the condition of the child will permit, and the operation upon the bony palate and velum from the sixth to the twelfth month.

In operating for single hare-lip, preference is given to the Mirault method as most likely to produce a lip of normal length and width. In closing the hard palate he prefers the Langenbeck operation, muco-periosteal flap, from the fact that in a majority of instances it succeeds in filling the gap with osseous tissue.

In cases of double cleft of the lip and palate with protrusion of the intermaxillary tubercle, operation should be advised at the earliest possible day, as these children are prevented from taking the breast or even the bottle ; feeding by the spoon is therefore the only method that can be used, and on account of the difficulty in swallowing they, as a rule, do not obtain sufficient nourishment to properly sustain the functions of life, and as a result many dwindle away and die. Early correction of the deformity in the anterior portion of the mouth is therefore imperative.

It is customary with most surgeons, in operating upon these cases, to cut away the protruding intermaxillary tubercle and close the lip upon the median line. This certainly is the easier method, but it is open to serious objections,—first, because this portion of the maxilla contains the incisor teeth ; second, because it removes the bony column upon which the nose rests ; and third, because it produces an extreme narrowing of the face in the incisive and canine regions, with more or less complete stenosis of the nostrils, a deformity which can never afterward be remedied.

The preferable method is to replace the intermaxillary tubercle by removing an inverted V-shaped section from the vomer ($\wedge$), and carrying the tubercle into position and retaining it there by a wire suture passed through holes drilled in the vomer anteriorly and posteriorly to the point of section, and allowed to remain until union has taken place.

If the lateral surfaces of the tubercle now come in contact with the lateral halves of the maxilla, the occluding surfaces should be freshened, and one or more fine silk sutures passed through the gum-tissue upon either side. When the surfaces do not occlude and the separation to be overcome is not very great, forcible pressure can be made upon the malar bones by the hands of the operator until the surfaces meet, and afterward held in position by means of the Hanesby truss or rubber band, as suggested by Garretson.*

In closing the lip it is preferable to utilize the central portion if it is of sufficient width to admit the passage of sutures, rather than to cut it away, and unite the lip upon the median line.

The Golding-Bird operation is the one now usually practiced by the writer in these cases; it consists in removing the vermilion border, on all sides, leaving the central portion with straight edges. The lateral halves of the lip are then dissected from their attachment to the bone, and then pared to fit the trimmed prolabium. In order to obtain a sufficient amount of tissue to form a good lip it sometimes becomes necessary to carry an incision around the ala of the nose and into the cheek. A deep suture is passed near the border of the lip, just above the edge of the mucous membrane,—it is often impossible to pass more than one,—and the edges of the skin and mucous membrane brought into nice apposition with fine interrupted silk sutures.

To relieve tension and protect the wound it is covered with a collodion dressing, and over this an adhesive strip.

The writer prefers to replace the maxillary tubercle and close the lip at the same time. Operation upon the fissured palate should be deferred till a later period. This operation he has performed several times with uniformly good results. One child was but six days old, but the operation was well borne, and he took the breast three hours afterward. The others were between two and six months old.

I will now describe a method of procedure for closing the velum palati which I do not remember to have seen suggested before, and which in my hands has given good results. This method is especially adapted to those cases where the cleft in the velum is the only oral defect.

The usual method is to freshen the edges of the velum with a bold hand, most surgeons claiming that successful union is more often obtained by this method than when less tissue is cut away. This, so far as obtaining good union is concerned, is a self-evident fact; but why sacrifice tissue when there is generally so little, in the first place, to operate upon? The main object is to restore function, and this can only be accomplished by restoring the velum and uvula to their proper width and length, so as to insure a perfect occlusion of the naso-pharyngeal opening.

In paring the cleft by either the bold or conservative method, the parings are usually sacrificed. By the method which is now presented, the parings are utilized to broaden and lengthen the velum and form a new uvula.

In the act of deglutition the velum palati is drawn up against the walls of the pharynx, the base of the uvula filling the depression upon the median line, formed by the approximation of the two sides of the pharynx, thus perfectly closing the naso-pharyngeal opening and preventing the escape of food into the nasal passages during the act of swallowing, and materially assisting in the production of articulate speech by preventing the escape of certain sounds through the nasal passages.

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* Garretson, "Oral Surgery."

By the operation suggested, every particle of tissue is saved and carried to that part of the velum where it is most needed to improve the shape, the width, and the length.

The method is similar to that often practiced upon single hare-lip,—viz, a curved, pointed bistoury is inserted just above the apex of the cleft and carried downward toward the uvula of one side, about one line from the cleft at the apex, gradually increasing the distance as the bistoury approaches the uvula to about two lines from the edge of the cleft and three lines from the posterior border of the velum. This incision is repeated upon the opposite side.

The apex of the paring is then carried backward, and the freshened edges approximated and sutured.

Three or four sutures are generally inserted, silver wire being given the preference as less likely to induce suppuration or ulceration about the sutures. Tension is relieved, when necessary, by dividing the tensor palati muscle upon either side, but the procedure is by no means always indicated.

The after-treatment consists in keeping the wound and sutures as clean as possible by swabbing and spraying the parts with the Thiersch antiseptic solution at least every two or three hours. The sutures are allowed to remain from four to ten days, according to indications.

In conclusion, I desire to exhibit a pair of curved needles and a pick-up, which are especially adapted to this operation in the mouths of little children. The points to which I desire to call your particular attention are the shortness of the curve, which permits its use in the smallest or narrowest maxillary arch, and the Jackson eye, which greatly facilitates the threading and unthreading of the needle, and thereby considerably shortens the time consumed in the operation.

AN OBSTINATE CASE OF TOOTH-DISCOLORATION.

BY R. M. SANGER, D.D.S., EAST ORANGE, N. J.

(Read before the Second District Dental Society of New York, Brooklyn, March 12, 1894.)

MR. PRESIDENT AND GENTLEMEN: It is my purpose to present to your honorable body to-night one of my mistakes, in the hope that it may prove a warning, and prevent others from falling into the same error. A lady presented herself at my office with two badly discolored central incisors, giving a history of devitalization, treatment, and root-filling with gutta-percha, which, upon investigation, proved to be correct. The crowns were beautifully filled with gold, one having a large contour filling, and the entire work giving evidence of superior skill, the only defect being in the color of the teeth, which had gradually grown darker and darker until she was constrained to seek the advice of a dentist, having about concluded in her own mind that it would be best to have both teeth cut off and crowned. It seemed a pity to do this under the circumstances, and

I decided to attempt bleaching. Having removed the fillings from the pulp-chamber and about one-half of the canals, I was gratified to find that the contour filling did not seem to protrude into the pulp-chamber, and I decided not to disturb it; but herein lay my error, as the result proved. As I had recently read Dr. Kirk's paper on sodium peroxid, I decided to employ that agent, and, procuring some of the powder from Philadelphia, I followed the writer's instructions closely, and one of the teeth improved rapidly, but the one with the gold filling did not, and, in order to hurry it, I changed the treatment, using chlorid of lime and acetic acid, being careful not to use any metal instruments. This method was apparently successful after three treatments, and I dismissed my patient, both of us being much gratified with the results obtained. Imagine my disgust when, a week later, my patient returned with the statement that the teeth had remained all right until the fourth day, when the right began to darken until it was a decided shade of blue-black. I immediately removed the gutta-percha and treated with chlorin again, getting a good color, but my patient was back again in a few days, presenting the same blue-black discoloration. Feeling assured that I had not reached the cause of the trouble, I gave the patient an appointment some time ahead, in order to gain time, and proceeded at once to consult books and friends, reaching the conclusion that I had an auric-chlorid stain. I then wrote to Dr. Kirk, who advised a plan of treatment which was carried out in detail, as follows: First removing all metallic fillings, which, of course, meant the beautiful contour which had undoubtedly got me into all this trouble, and carefully avoiding the use of metal instruments of any kind, the rubber-dam was adjusted and the cavity was thoroughly washed with a solution of Labarraque's solution four ounces, distilled water four ounces, muriatic acid c. p. ten drops, using the entire amount in order to insure thoroughness, followed by washing with hot distilled water and desiccation with hot air. A fifty per cent. solution of sodium peroxid on asbestos was then applied for fifteen minutes, and then an application of dilute sulfuric acid, ten per cent., was made. This was well washed with hot water, and a second application of sodium peroxid for five minutes, following with the acid, was given, and the tooth was again thoroughly washed with distilled water, as hot as could be used, and, after drying and desiccation with hot air, a gutta-percha filling was introduced,—the tooth having regained its normal color. The object was, first, to remove the auric-chlorid stain. The auric chlorid being soluble in chlorin water, this was accomplished by the chlorin solution. Second, to remove the discolored organic matter as far as possible by the action of the sodium peroxid; and third, by the action of the acid upon the sodium peroxid to produce hydrogen peroxid, thereby increasing the bleaching by mechanically removing the contents of the tubuli by the evolution of gas produced by the reaction in them. The final washing is of course necessary to get rid of the by-products of the treatment. It is now about eight months since the work was done, and the teeth have not shown any signs of darkening again.

A COMBINATION OXYPHOSPHATE AND GOLD FILLING.

BY I. C. ST. JOHN, D.D.S., MINNEAPOLIS, MINN.

THE method of making a combination filling of oxyphosphate and gold, as herein described, is applicable to accessible cavities which are deep and have thin, weak walls and margins.

The result of the combination is a filling embracing all the acknowledged good features of a cement filling, also one with a permanent surface. There are many different styles of cavities, in which this method, or a combination of it with the ordinary method of filling with gold, may be employed, but for this description I have chosen a simple one (Fig. 1, A), and will only give the simplest method of making such a filling. Into the cavity a ball of oxyphosphate is placed, which has previously been quickly mixed and is just thick and dry enough not to adhere to the fingers when it is rolled between them.

The cement is to be quickly forced against every portion of the cavity, but that which is in contact with the lower wall of the latter is immediately drawn up and away from it, leaving a crevice into which is to be tucked the end of a previously annealed strip of No. 60 or No. 120 gold, or better, iridium gold.

FIG. 1.

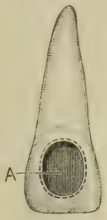


FIG. 2.

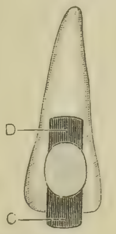


FIG. 3.

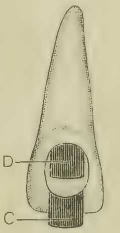
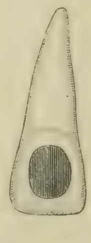


FIG. 4.



The cement is to be immediately forced down against the gold, pinning the latter firmly against that wall of the cavity (Fig. 2, C).

The end of a second piece of annealed heavy gold is introduced in a similar manner at the cervical portion of the cavity (Fig. 2, D).

The surface of the cement, when hard, is to be carefully trimmed off, so as to leave sufficient space for a thick layer of gold over it.

The hard cement surface is then to be carefully moistened with a little oxyphosphate, mixed very thin indeed, and the free end of the upper piece of gold (D) is immediately brought down over it, and adapted to the moist cement surface, by holding it in place with a strip of cottonoid, or some other suitable material, while a burnisher is thoroughly applied to the latter, thereby causing the gold to perfectly conform to the surface of the cement (Fig. 3, D), while the cohesiveness of the gold surface is fully preserved. The lower piece of gold (Figs. 2 and 3, C) is then to be lapped up over the other piece of gold (D) and both burnished and malleted to it, the burnishing being accomplished in the same manner as was that of the first piece of gold.

To the gold foundation thus provided sufficient gold can be readily added to secure a strong surface and good margins. The finished operation will then appear as shown in Fig. 4. The advisability of introducing other strips of heavy gold at the sides of such a cavity must rest with the individual operator to decide, as is also the case relative to the use of grooves cut into the cement, or into the walls, wherever there is strength of tissue to justify it. One point which it is well to bear in mind is, that the thinnest wall and margin is the one against which the gold is to be placed in this manner. The gold strips so fastened between the cement and walls of the cavity offer resistance to force at the edge of the filling, where it is of the greatest value. The layer of thin cement makes a smooth and perfect joint, and, when set, the adhesive qualities of the cement are a benefit.

DIFFERENTIAL DIAGNOSIS BETWEEN BENIGN AND MALIGNANT GROWTHS IN THE ORAL CAVITY.

BY SIGEL ROUSH, M.D., D.D.S., WASHINGTON, D. C.

THE surgeon dentist is often called upon to give important decisions in diagnosis. This is especially true when applied to pathological growths in and about the mouth. This region is a very common location for both benign and malignant tumors, and a correct diagnosis in these cases is of the utmost importance to both patient and dentist; nor is it always a simple task to differentiate between the harmless growths and the more malignant and vicious tumors which often have their origin in the soft tissues or the osseous structure of the mouth. The careful dentist will not dismiss his patient who comes to him with an inflamed or abraded spot on the mucous membrane of the mouth or lips with a casual examination and the application of a little iodin, but will, after a thorough inquiry into the etiology of the case, if any doubt still remains, submit a few cells of the diseased membrane to the only decisive test—the microscope. Epithelioma, or epithelial cancer, is commonly found in the mucous membrane of the mouth and upon the papillæ of the tongue. It is well known that this variety of carcinoma is localized and developed by continued irritation at a given point of the mucous membrane. The sharp cusp or ragged edge of a tooth will sometimes give rise to epithelioma. It is often, therefore, impossible, except by the aid of a microscope, to determine whether the rough surface of a tooth has simply abraded the mucous membrane, or has localized in a subject predisposed to cancer, a true case of epithelioma. If the latter, then the necessity of an early operation is at once apparent. It is not the intention of the writer to attempt a lengthy description of the cells in malignant growths as differing from benign conditions when examined under the microscope,—this is doubtless familiar,—but to urge a more careful examination in these cases. The cells of epithelioma are, as a rule, flattened and distorted in shape, and usually contain a single nucleus. The arrangement of the cells is characteristic of this variety of carcinoma. The irregularly tubular-shaped lobules communicating with one another and the masses among the meshes of a stroma, and the tendency to concentrical arrangement as the outer border is approached, are all characteristic of epithelioma, and wil be readily recognized by one at all familiar with the pathology of malignant cell-proliferation.

Objectively, the epithelioma usually is first seen as a small, hard ulcer that may or may not present a break in the mucous membrane. Sometimes it occurs as a fissure with thickened edges. If patent, the edge of the surface is often irregular and presents a tendency to slough. Upon pressure, when the surface is broken, a milky semi-liquid exudes like sebaceous substance, although the tendency to fatty degeneration is less marked in epithelioma than in other varieties of carcinoma.

The other variety of tumorous growths most frequently found in the province of the dentist is the osteoma. It resembles in structure normal bone, and may be either dense or cancellous, depending upon which we have the two varieties,—the eburnated and the cancellous. Bony growths on the maxilla are rarely malignant, grow very slowly, and seldom attain any considerable size. These tumors usually originate from the periosteum, and may easily be removed by the chisel or engine after dissecting back the soft tissue. Cocain is usually sufficient in these operations. In most cases a line of demarcation is discernible between the abnormal and true bone, and under proper antisepsis the operation is comparatively a simple one. However, here again we must be on our guard for osseous growths which exhibit malignant characters. In these cases the operation must be more extensive and careful. In order to insure success every infected cell must be removed. Benign growths, therefore, must be carefully differentiated from chondromata or sarcomata, sometimes called osteoid sarcoma. In this variety the growth is usually more or less calcified, exhibiting bands and patches of granular appearance. Here we often find—especially near the true bone—true Haversian canals, lacunæ, and traces of canaliculi with well-developed fibers in the spaces. As a rule, it is an easy matter to distinguish the harmless from the malignant growths of the mouth, and the dentist who fails to give these subjects the proper time and attention is grossly derelict of his duty, and may, by allowing the disease to spread, place his patient beyond the reach of surgical aid.

PROCEEDINGS OF DENTAL SOCIETIES.

TENNESSEE DENTAL ASSOCIATION.

THE twenty-seventh annual meeting of the Tennessee Dental Association was held at Nashville, March 26, 27, 28, 29, 1894. The morning session of March 26 was held at the Vanderbilt Dental College, and was opened with prayer by Rev. P. J. Gleason, Nashville, Tenn. The address of welcome was made by Dr. L. G. Noel, Nashville, of which the following is an abstract:

Members and visitors of the Tennessee Dental Association, it has been made my pleasing duty to offer you a few words of welcome to the city of Nashville on this occasion. You have left your homes and patients to spend a few days here in the consideration of questions of scientific interest and matters having a bearing on the advancement of your chosen calling. I see before me men who have come from great distances to attend our meeting, and for these, our invited guests, I have a warm and hearty welcome. I welcome you on behalf of the Tennessee Dental Association and on behalf of the dentists and citizens of Nashville. I trust you will pardon the local pride which prompts me to remind you that Nashville is no mean city, and that she stands second to none in the brilliant galaxy of Southern towns in culture, learning, and scientific progress. We point with pride to our two great universities and various other institutions that make our city the center of education, and for which she has been aptly styled the Athens of the southwest. I am commissioned to invite you to visit and inspect these universities, colleges, and schools. Many of Nashville's sons have achieved greatness in the fields of politics and science. The climate of Tennessee is superb, and the mean temperature is so temperate as to make it most desirable as a place of residence. I welcome you again to our city and our firesides, and bid you enjoy your visit here to the utmost.

Then followed the president's address by Dr. W. J. Morrison, Nashville, who said in part,—

The importance of associations of this kind for the advancement of science is becoming more apparent each year, and the vital necessity of attendance upon our associations has long been recognized by the better element of our profession. In this respect, as in many others, the science of dental surgery leads. This was clearly demonstrated at the World's Columbian Dental Congress at Chicago in August, 1893, for never in the history of the world was there such a meeting for the advancement of a specialty of medicine. Nearly every nation on the face of the earth was represented.

Dental Law.—One of the most ominous signs that threaten this glorious nation of self-governed people is that patriotism is dwindling into insignificance. It is with sorrow and humility that we realize that men of ignorance and low instincts and character are forcing themselves into the law-making assemblies. They enact dental laws that are a mean pretence at protecting the public. The dental law of Tennessee allows any one to perpetrate the crime of extracting teeth. It is your duty to endeavor to secure the correction of abuses in our laws, and it is your duty to see to the enforcement of the laws, and not leave that to the board of examiners. It would be of interest to all life insurance companies to increase the rate of insurance in states whose laws permit mountebanks to ruthlessly extract the teeth of its citizens, and thereby reduce the average of human life.

Advance of the Profession.—From a position of reputed inferiority we have risen to the rank of an acknowledged branch of scientific medicine, and the status of dentistry is most gratifying. But while we have advanced the standard, we should yet require every student to possess the title of M.D. before entering upon the course of study for the D.D.S.

Other professions, as the law, suffer from a degraded conception of the standard by the public. We suffer from this also, as witness the indorsement of shams and nostrums by even the ministers of the gospel.

The Code of Ethics.—You should make your own welfare secondary, giving the good of the community the first place, and the code should embody rules to that end. Every professional man should keep abreast of the times, and observe the code of ethics in his dealings with his professional brethren and with the public.

Dental Literature.—We should, for the advancement of the professional standard, subscribe for those journals which maintain this dignity; the others should not be allowed to enter the office.

The Secular Press.—A standing committee of the association should have charge of preparing matter for the secular press, for the education of the people, that that powerful engine shall be made to do the right kind of work, instead of advertising quacks and dental nostrums. Short and comprehensive articles on the care of young mothers' teeth, the wonderful phenomena of reflex action, facial neuralgia superinduced by dental irritation, etc., would be of incalculable benefit to the community.

Dental Schools.—The colleges must be forced into line and compelled to keep abreast of the times. Avoid the school that instills into its pupils the false notion that dentistry is a trade. There is a moral responsibility attached to your position in this respect which demands that before you advise a young man what school to select you examine into the character of the school and of the men conducting it. If you do not, you jeopardize the prospects of your confidant and add to the army of recruits that are undermining the standard of your calling. Especially advise them to beware of the institutions that blazon forth their wares with gorgeous advertisements and dazzle the youth with the tales of the fabulous wealth they are accumulating. Do not indorse or recommend colleges that have not complied with the law governing the recognition of colleges.

A response on the part of visitors was given by Dr. S. W. Foster, Decatur, Ala.

Adjourned.

Afternoon Session.

After the transaction of miscellaneous business, a paper was read by Dr. John S. Marshall, Chicago, Ill., on "Congenital Fissures of the Upper Lip and the Vault of the Mouth."*

Discussion opened by Dr. A. O. Hunt, Iowa City, who said in the performance of operation of closure of the soft palate in infants there is always a question of its being successful, and in adults, where the tissue has been divided, the result has been almost universal failure. There is a doubt if any surgical operation upon cleft palate will be permanent, for many conditions stand in the way of success. Where the palate only is divided, as in Dr. Marshall's operation, he did not see how it is possible to draw the tissue together without shortening the velum by pulling the tissue up into the fissure. If the velum is shortened in any way, the efforts of speech and deglutition will not be successful, because the opening will not be thoroughly closed. In surgical operations he has never seen any good restoration of speech. He wished to give Dr. Marshall credit for his new method, which he hoped may be of some benefit. In all individuals afflicted with cleft palate there are certain sounds which they never make, as *g*, *k*, etc., for they are always made in the normal condition by the tongue meeting the uvula and thus closing the opening; but in cleft palates the opening is never closed, and this operation does not close it. He knew of but one case which attained anything near a good sound, and that was on account of enlargement of the circular pharyngeal muscle, which helped close the opening, but that closing was abnormal. He feared the velum would be shortened in any operation, and would thereby interfere with correct methods of speech. He should feel doubtful about operating in infancy, but would rather leave the case to a later period and then put in an obturator, by which procedure the patient would be better served. The plastic operation at any age will never give the benefit which may be derived from an obturator.

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* Dr. Marshall's paper will be found at page 372 of the current number.

Dr. A. H. Thompson, Topeka, Kan. I desire first to pay a tribute to the genius and skill of Dr. Marshall, who has done so much to advance the cause of oral surgery in the dental profession, and whose brilliant operations have reflected so much credit upon us. An interesting phase of the study of these cases of defective formation of the palate and lip is the comparative study of the subject, and its investigation from an embryological standpoint. We know that in lower forms the gill-arches which we find on the sides of the vertebrate skull, and which are representatives of the visceral arches carried forward, remain as a permanent condition, as in the fishes and the water-breathing amphibians ; but in the higher vertebrates these two arches are soon obliterated at an early stage of embryonal life. The embryos of all the higher vertebrates pass through the lower stages of life, and the fetus presents these gill-arches at an early stage of its existence. Later on they come together and coalesce to form the vertebrate face, and a failure to so unite produces the defects known as cleft palate and hare-lip. This is due to insufficient nutrition and to degradation of growth-force, but why this should be we are not yet able to tell. We only know that it is caused by insufficient development due to malnutrition.

Dr. W. O. Kulp, Davenport, Iowa, had assisted, in an early day, in the performance of many of these plastic operations for the closure of cleft palates, and had failed to see one that was entirely successful and satisfactory, owing to some defect or other in the operation. He admired Dr. Marshall's skill, but had never yet seen a successful plastic operation, although he had seen many successful closures with mechanical appliances, especially those from the hands of Dr. Hunt. He would not attempt a plastic operation until he had made a mechanical appliance, and had accomplished as much as possible in that way first.

Dr. J. J. R. Patrick, Belleville, Ill. If we reflect how the superior maxilla is formed, that it is all made of the processes that are thrown out from each side of the face, we must know that a defect in these processes means a fatal loss of tissue. At one month old these processes are mere egg-shells ; they contain only the crypts and germs of the teeth, and they cannot be drawn together as described in Dr. Brophy's operation without pulling the wires through the soft bone or deforming the face.

As regards the origin of cleft palate and hare-lip, we must remember that the processes grow from the sides in the embryo, and must grow with equal speed to meet at the proper time in the center ; if they do not grow equally and come together in the center, there is a defect, a cleft. The wonder is not that nature sometimes does so poorly, but that she does so well with all the possibilities against her. The vomer grows down and carries the intermaxillary, and, if imperfect, we may have hare-lip on one or both sides. We may have cleft palate without hare-lip, but never hare-lip without cleft palate. Closure by operation will be but partial cure, as we cannot restore lost tissue. When the vomer is not present, and we have but a single sinus, one of the most important organs of speech, the nose, is seriously affected.

The vomer is always absent when the intermaxillary bone is absent. I have made many restorations, but by artificial means. I have put in an artificial vomer septum, and have been partially successful in restoring speech. But much depends on the intelligent help of the patient in overcoming the habit of imperfect and unnatural speech after any operation.

These defects are often called monstrosities, but they are not so. They are not due to excessive development, but to lack of development. There may be a perfect fetus, but an imperfect child, owing to lack of development at a later stage. All these plastic operations can be performed, but their success as a restorative means is always doubtful. Many cases could be restored by artificial means if they had not first been meddled with by the surgeon.

Dr. L. G. Noel, Nashville, Tenn., rose to thank Dr. Marshall for his valuable paper. He thought we could yet advance to perfection along the lines laid down by Dr. Marshall, for to "Young America" everything is possible,—there should be no such thing as failure in American surgery.

Dr. R. R. Freeman, Nashville, Tenn. Years ago he had performed the ordinary operation for closure of cleft palate, and with his experience and observation he must say that he does not believe that "Young America" is yet or ever will be able to reproduce absent tissue, which is sure to make this operation a failure. In the operation described by Dr. Marshall, where the muscles are divided there must be considerable play, for the tissue must be relaxed for all ordinary functional actions. A little surplus of tissue is necessary. No one is justified in attempting the operation where the cleft extends up to the bone of the hard palate ; he cannot get enough tissue to fill it up. He had seen the parts slough from being stretched, and had seen the palate as tight and stiff as a drum-head. A perfect operation may be performed and the patient talk the same as before. If they do not enunciate well, you do not succeed ; but, of course, much depends upon the patient. Still, if we make a success now and then, even that will repay us for the labor and anxiety involved ; but he believed the artificial means of restoration offered the only hope of benefiting unfortunate humanity in this operation.

Dr. J. Y. Crawford, Nashville, Tenn. In all the affairs of the world, mental preparation must precede all operations of importance. It follows by experience that nothing is as successful as it might have been.

There is no surgical operation to-day that is more successful than that for the closure of hare-lip, and the expectation of the day when operations on cleft palates will be equally successful justifies the operation now, to do as best we can, even if we do not fully understand the anatomy and embryology of the subject. We must not discard operating on account of failure, for even the mechanical appliances have not always been successful. He had never seen one that was successful and satisfactory to both patient and operator. It has been objected to the operation that it may induce mouth-breathing; but, aside from this, operative procedure cannot be otherwise than successful, even if you do not restore speech perfectly. If he had a child with this deformity, he would certainly submit him first to a surgical operation to accomplish what was possible in that way, and then, later on, apply an artificial apparatus.

Dr. Marshall. In the operation described in the diagram there was deficiency of tissue, so that the parings were used to fill in at the posterior border of the palate. In most cases the tissue is so deficient that you cannot bring the edges together without tension. In some cases, where there is a sufficient amount of tissue, and the palate does not become tense, the operation can be successfully completed, but where there is deficiency it cannot be so successful, of course. So the operation must be performed in selected cases only, as it would be folly to do it in cases where there is a manifest deficiency. In regard to age, in infants where there is congenital cleft of the lip, the closure must be performed at once, that the child may nurse and live. When the soft palate is cleft also, we should operate on the hard palate first, lifting the soft tissue from the palate bone, and drawing it over the fissure and suturing it. With clefts in the lip and the hard palate closed, and where there is not tissue enough to make a good operation on the soft palate, he would turn the case over to the mechanical dentist to make an artificial velum. In infants where there was hare-lip and protrusion of the intermaxillary bone, he had operated within a few days after birth, and had the child take nourishment in three hours after the operation. The intermaxillary bone extending out from the vomer prevents the child from seizing the nipple, and the open cleft prevents it from sucking, so that death from starvation is sure to result unless operated on at once. He cuts a V-shaped piece from the vomer, carries the intermaxillary bone into place and sutures it, then closes the fissure in the lip. He afterward completes the operation on the hard palate.

Dr. Patrick. If the vomer with its pendent intermaxillary bones does not meet resistance and become attached, they will turn outward and protrude. A deficient vomer produces a deficient nose for articulation, and the vomer is always deficient in cleft of the hard palate.

Dr. Marshall begged to differ with Dr. Patrick. The vomer is never deficient in clefts when there is an intermaxillary bone developed. When the intermaxillary is absent, then the vomer may be undeveloped. In regard to mechanical appliances, all operations on the hard palate should be performed before it goes to a mechanical dentist, where the appliance seems necessary. He had seen many mechanical appliances that he should not consider as successful as his surgical operations. He had a case in which an apparatus had been worn two years by a woman of forty-five, and she could not speak so as to be understood, though she had been very faithful in her efforts to do so. He operated on her, on the hard palate first and then on the soft palate, and her speech was much improved.

TUESDAY, March 27.

Clinics were held from 9 A.M. to 12 M. at the Dental Department of the University of Tennessee. At 2 P.M. the meeting reconvened at the Y. M. C. A. building.

After the transaction of routine business, a paper was presented by Dr. R. B. Lees, Nashville, Tenn., on "Anesthesia: Local and General," of which the following is an abstract:

After describing the history of anesthesia, he said, "The discovery of anesthesia has been a great benefit to the profession. The success of general anesthesia led to the desire to secure a local anesthetic. Many have been used in past times,—freezing, narcotics, etc.,—and those of recent years have been more or less disappointing; but the desire to avoid the dangers of general anesthesia, the sickness, etc., and render the patient capable of helping the operator as well, made local anesthetics desirable. Nothing succeeded very well till cocain was brought to our notice in 1885. It was hailed with joy as an anesthetic suited to our purposes, but it has been a disappointment, like those that went before it. Its use is limited with us. The rhinologist gets good effects by spraying in the nose. In the extraction of teeth, opening of abscesses, etc., it must be employed by injection. Small injections affect but a small area, so that the needle must be reinserted several times to get extensive effect. So its application in dentistry has not been as satisfactory as in surgery. Nitrous oxid has been given to hundreds of thousands, with but few accidents or ill effects. It seems to be the one of most use to us. The effects are rapid and pleasant; our operations are soon performed, and the influence passes off soon, leaving no bad effects. To produce the profound effect, five to seven gallons are necessary. It does not make new compounds in the tissues like chloroform, so that it is soon thrown off. Ether and chloroform have been used and studied extensively. Operations have been performed and life has been saved that could not be done without it forty years ago. Forcible operating has passed away with all its horrors. Anesthesia is not a dangerous condition if performed in accordance with the laws of nature. The entire system is affected, but not equally; the medulla continues active, so that the vital organs are kept going. With ether, a mixture of air is necessary to prevent irritation. Stimulants should be used before anesthetics, to keep the vital centers active. Competent help is also indispensable."

Dr. D. R. Stubblefield, Nashville. My practice in recent years in the use of anesthetics has been greatly modified. I think local anesthesia is largely a failure, and this failure resides largely in the patient. Control of the patient is necessary; and as temperament has much to do with will-power, some persons are much more easily controlled than others. Some men can anesthetize with injections of distilled water, showing the effect of mental influence. If they can be controlled, a condition of the mind can be brought about by which they will expect but little pain. Cocain has an unquestioned anesthetic effect, which can be easily proven. Injection is the only certain way of introducing it, but you must be extra careful to insert the needle at the right spot. You can inject it into healthy gum, but the tissue is so tough that if you can make a bag of the tissue to hold it as in soft tissue, you can do more than I can. I have carried it down to the opening of the inferior dental foramen and to the infraorbital, and have extracted without pain. In one case I carried it down to the mental foramen. It benumbed the whole side of the face, and a solid lower bicuspid root was extracted painlessly. I have had some such successful cases, but have not always produced all I wished to do. If the patient is timid and has a fear of all our surroundings, of the instruments, and the thought of the operation, local anesthetics will do no good, and a general anesthetic is best for such cases. For such, local anesthesia is a figment and a sham, for it is useless unless you get the consent and control of the patient. You can really only benumb the surface, but cannot reach the deep parts at all. You must depend on influencing the patient, and but little on the anesthetic. Nitrous oxid produces an effect that is really a controllable suffocation. The condition produced and the final results are under your absolute control. It is the most satisfactory as well as the safest of the general anesthetics. A dentist should not administer his own anesthetics, but should have an assistant to do so, like the surgeon; he should never try to anesthetize and operate too, but should have a specialist in giving anesthetics to help him.

Dr. Noel uses a formula given him by a physician of Nashville, for anesthetic purposes, with good results. It is as follows:

Chloral hydrate, gr. 20;
Mur. cocain, gr. 6;
Aqua destill., oz. 6;
Carbolic acid, min. 2. M.

He first gives the patient a teaspoonful of aromatic spirit of ammonia. He injects a small quantity of the mixture at two or three points under the gum, waits five minutes, and then operates. He uses nitrous oxid also, and there are some important points in connection with the giving of that anesthetic which he has learned by long experience that he would like to give to the members. The first is to have an air-tight apparatus, so as to get the full effect of the gas; the next is to have the jaws well propped apart; and the next is to carry the effect to the full condition of profound anesthesia. The latter is necessary to avoid shock and to prevent recovery too soon. Hysterical persons present the only idiosyncrasies that contraindicate nitrous oxid, as they may approach epilepsy. It is always best to inquire into their history in this regard, especially of women who are disposed to be hysterical.

Dr. B. D. Brabson, Knoxville. His experience is that you can get as good results with psychical influences as with anesthetics. He uses injections of cocain and other anesthetics, but thinks the best plan is to persuade the patient to submit without them.

Dr. H. E. Beach, Clarksville, Tenn. Anesthesia for the removal of teeth is the greatest curse that the dental profession has ever had. It permits the removal of organs that are of great use and service to mankind by charlatans and quacks, because it can be done painlessly. It renders possible the wholesale destruction of useful organs for the miserable consideration of a fee, so it has come to be a curse to humanity. There are many agents that will produce local insensibility to pain; the principal one, and that lies at the base of all the anesthetic mixtures, is cocain. Where it is properly used it is a boon to the dentist, but in the large percentage of cases of extraction it is not necessary to use a drug at all. An injection of water will do just as well You can use water, and if you operate at once you will have a painless operation.

Dr. Marshall. The anesthetic effect of carbolic acid is well known.

Many surgeons immerse their instruments in a five per cent. solution of carbolic acid, and after using it the fingers will become so benumbed as to interfere with operating. The injection of two per cent. cocain solution for extraction has been used, with good effect and no bad after-results. One per cent. of carbolic acid prevents the cocain solution from forming fungus.

Dr. Patrick had experimented, and believed no fluids could be forced through the alveolus to the tooth. Had applied simple water topically and appeased the fear of the patients, so that the operation did not pain them much. There is always a charm in mystery, so that anything that will act like magic will attract weak minds. Anesthetics act through the whole system. Local applications or injections will not go through the bony walls. The mind is worked upon, as when the street charlatan rubs coal-oil on the victim's gums with his dirty fingers and extracts the tooth, and they say it does not hurt a bit. The topical application of water is just as good, if you get the mental condition of the patient just right.

Dr. Stubblefield thinks that cocain is one of the best agents for local use in the soft tissues in local surgery. It is used in the nose with perfect success. In regard to the effect on the nerve-trunks, it is said that it travels with rapidity to the periphery and then back again along the nerve-branches to the parts. The fifth pair will be affected just like any other branch, of course.

Dr. Marshall. We know that by a spray of a two per cent. solution of cocain in rhinology you get a perfect anesthetic condition of the mucous membrane and of the turbinated bones, so that the bones can be excised or cauterized without pain. In extracting teeth you must get the needle through the gum to the periosteum, to get the full effect of the drug.

Dr. Beach, Clarksville In the use of distilled water you must operate immediately, while the circulation is driven out of the parts.

Dr. W. C. Sheppard, Columbia, Tenn., had used five per cent. solution of cocain on a patient with bad result. They had a hard time restoring the patient.

Dr. S. B. Cook, Chattanooga. Is it right to recommend the use of cocain? There is often a bad effect following it. He knew of a case where a dentist had extracted thirteen teeth, injecting on each side of each tooth, and the patient died. It is being used too extensively and is too dangerous, and he believed it should not be done.

Dr. W. G. Brown, Atlanta, Ga. In our local society we have decided that as cocain leaves such bad effects, we ought not to use it. It is time that the profession took a stand against the use of local anesthetics, and especially in the shape of the quack nostrums that are sold of which we do not know the composition. It is only since the introduction of cocain that these nostrums have been possible for use by injection. They are dangerous, aside from the question of ethics, and reputable dentists should not use them.

Dr. Freeman, Nashville. The object of the dental profession is to serve humanity, and to do so we must save the teeth. We should not extract; we can make even old roots useful. Patients get the notion that extracting can be easily done, and they would rather have teeth extracted than filled. Their sufferings are the result of neglect,—of violation of nature's laws. Let them suffer pain! let them pay the penalty ! and they will learn to take care of their teeth. If we go at it right, we can induce patients to submit to our operations by the exercise of will-power, then we can do them good because of their willingness.

Dr. Marshall. In regard to the cases of fainting, they were due to overdosing ; you introduced too great a quantity, and got a toxic effect. He had tried a five per cent. solution of cocain with two per cent. of carbolic acid, and the patient fainted, and they had a hard time restoring her. You should only extract one or two teeth at one sitting, because if you use only a weak solution frequently you will get the cumulative effect. Keep on the safe side. Sloughing is caused by a filthy needle. We are not as careful as we ought to be with our instruments. We are not as careful as the surgeon, for, like him, we should always cleanse our instruments by boiling them in water. He has never had any sloughing, because he is always careful with his instruments. [In reply to a question.] He has never used morphine or any antidote, but prefers and uses stimulants, as cocain is a heart-depressant.

Dr. W. Crenshaw, Atlanta, Ga. A good deal of the trouble that comes from the use of local anesthetics comes from not knowing the formula of the mixture you employ. We should know that. Of course, the ignorant man might know it and still have trouble. The use of local anesthetics should be discouraged. Knowing their bad effects, he had not used them. A quack he heard of used a nostrum preparation in a case and had success ; then in another case, which did not do so well, the patient nearly died, and great difficulty was experienced in trying to restore her, so he disappeared and skipped a county or two before bobbing up in a new place.

Dr. Kulp. When we add anything to the cocain mixture, the best thing to use is ordinary listerine, which is a good antiseptic. He had used it frequently with no bad effects. It will prevent sloughing. He would not make any mixture without listerine. He adds to it hydronaphthol. Cocain is a heart-depressant ; hydronaphthol is a heart-stimulant.

Dr. Gordon White, Nashville. There is no doubt but that the stronger solutions are poisonous. He had used the four per cent. with success and no bad results, and the ten per cent. with bad effect in several cases.

Dr. W. H. Morgan, Nashville, had watched the growth of antiseptics since their first introduction into this country. He saw the administration of chloroform to the first forty cases. It was very useful, and had some serious objections. The same may be said of ether. He had used nitrous oxid with good results. He had used cocain when it first came out, but it had its objections and was unsatisfactory in many respects, like the rest. No man can say what the effect of any anesthetic would be until he has used it extensively. Carbolic acid destroys the tissues where it touches, unless it can be carried off. He had seen ulcers where the local anesthetics had been used. He has long eschewed the use of anesthetics, except in rare cases. Ordinarily no man is justified in giving a general anesthetic, and more rarely a local anesthetic.

The next order was a paper by A. H. Thompson, D.D.S., Topeka, Kan., on "The Missing Teeth of Man." (See page 337, current number.)

Discussion.

Dr. Patrick said that this was a subject that had long interested him. Anomalies in teeth, as well as in other parts, are common, as disease itself is common. Atavism is a return to former conditions, and is a law of progressive development by which portions of the body are dropped and then reproduced later. He started in fifteen years ago to examine all the crania in the United States, tabulating the results. The American Dental Association took hold of it, and the examination, as far as the United States is concerned, is now complete. The tables are now prepared, and the first report is printed. The result of these investigations is that in the earliest crania examined man was then liable to caries, to suppression of the third molar, to irregularities, and the appearance of aberrant teeth. The Esquimaux, Patagonians, Indians, Africans, etc., all show signs of disease and abnormalities. In fact, among the early Peruvians and Mexicans, suppression of the third molar was common. Aberrant teeth are the shapeless, imperfect, supernumerary teeth as distinguished from supplemental teeth, which are well-formed supernumeraries. They were about as common with the early races as with us.

Prognathism in the lower races does not show in the first dentition any more than with our children, but in the second dentition the teeth grow out and protrude. But this is mainly because the cranium does not grow out and overshadow the jaws in the lower races as it does in the higher, so prognathism is relative. The law of variation is constant. It exists everywhere. No two organisms are alike. Matter is changing. Only the inner, typal life persists. He cannot agree with the essayist, that the apes are higher in the form of the teeth than the Australians, for in the latter the cuspids do not protrude, are not half the size as in the apes ; there is no space between the cuspids and lateral, etc. In regard to teeth being suppressed as civilization progresses, such a thing as indications of this cannot be observed in the known history of the race. Charles Darwin never thought of such a thing. The speaker had listened to lectures and papers on the suppression of the third molar, but does not believe it. The forms of the teeth are due to the jaw movement. The part of the jaws anterior to the first molar is where the most change takes place. There is a reason why the form of the bicuspid is as it is,—a law that is fixed by mechanical laws, and provides that the teeth shall not be of any other form than that they are.

Dr. Marshall. The general idea of the evolution of man is revolting to me. Some of the strongest supporters of Charles Darwin have now given it up, and admit that in man at least there must have been a distinct and separate creation. All the specimens exhibited are simply anomalies. I can see no indication of a reversion to a primitive type, although to the evolutionist there seems to be such ; he may be looking through prejudiced eyes. As I am not an evolutionist, I look on them simply as anomalies. [Replying to a question.] He had seen many surgical diseases caused by an impacted third molar. In one case of trismus he had removed a third molar from a cyst and found five irregular, anomalous teeth beneath it. Were these teeth reversions? He thought them mere anomalies ; the epithelium of the enamel-cord, after it is cut off from the enamel-organ, breaks up into tiny globules, and these are finally absorbed ; but if for any reason they are not absorbed and come in contact with the dermal layer of the mucous membrane, anomalous teeth are developed as a result. This is the way he accounted for such formations.

Dr. Beach believed that anomalies called supernumerary teeth were all departures from nature ; we cannot account for them. He did not believe in evolution, and did believe that man was a separate creation. We do not appreciate the possibilities of change by natural transition ; various reasons have been assigned for anomalies, the mental influence of the mother on the development of the fetus, for example ; that is a subject he had investigated, and did not think its importance, or the influence of maternal control, has been sufficiently recognized.

Dr. A. H. Thompson, in closing, said that there were differences of opinion as to evolution, and that every one was entitled to his opinion. Of course such opinions would color our studies, and to the evolutionist such anomalies as supernumerary teeth presented most interesting examples of the work of that great and beautiful principle. Evolution was indeed one of the great and wonderful laws of nature. The speaker felt grateful for the reception of the paper, and wished to enlist the interest and assistance of the members present in collecting specimens to carry the study further.

(To be continued.)

FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK

THE First District Dental Society of the State of New York held a regular monthly meeting, Tuesday evening, March 13, 1894, at the New York Academy of Medicine, No. 17 West Forty-third street ; the president, Dr. William Carr, in the chair.

Dr. John H. Meyer, chairman of the clinic committee, presented the following report, which was read by the secretary :

CLINIC REPORT.

A clinic was held this afternoon, under the direction of your committee, at Lyric Hall, No. 723 Sixth avenue, opposite Bryant Park, at which there were present five hundred and forty-two dentists of this and from neighboring cities.

Dr. W. G. A. Bonwill, of Philadelphia, was expected to clinic on his "new method of general practice," but no patient was produced as a proper subject. He, however, gave an exhibition in his own mouth of the practical application of his "method of clasped, sectional, realistic plates," to be used in nearly all cases instead of mutilating the teeth as by the ordinary plan of bridging. He exhibited many extreme cases of its application, and informed us that it had been in use for about six years.

Dr. Bonwill exhibited also a new application of his dental engine-arm to the Elliott suspension, which obviates the use of any heavy weight on the hand-piece or the mechanical mallet, and makes them as light as a feather, giving more force, greater speed, with less power needed to drive it by one-half. For the mallet it is unusually adapted, as no oscillation at the point is observable.

Dr. C. M. Richmond, of New York, presented an upper case of portable or movable bridge-work in the mouth, which is retained by two molars. The case has been worn ten years, and the two teeth are as strong and gums as healthy as when the case was inserted. There is no drooping of the front part, and the case is used as if the teeth were natural. Dr. Richmond also gave some of the details of construction of movable bridge-work, stating that he no longer uses fixed bridges in cases of three or more teeth. He also presented some finished bridge cases and crowns, showing a simple and practical method of bridging. Dr. Richmond also presented a new hand-piece for the dental engine, which has many features to commend it.

Dr. S. C. G. Watkins, of Montclair, N. J., demonstrated his method of taking impressions for partial cases. At first an impression was taken in wax. Then, where the teeth were, it was cut away to make more room. A small quantity of wax was then heated until very soft, and a rope made of it, and left in hot water, so that it might remain perfectly soft until the plaster was mixed, and placed in the wax impression. Then, holding the little rope of wax around the straggling teeth with his fingers, he placed the plaster in the mouth and pressed it home firmly, holding it there until it was thoroughly hard; then he removed it from the mouth without tearing or breaking it to pieces. The wax which was molded around the teeth gave sufficiently to allow of its easy removal. The wax which had been pressed around the necks of the teeth had moved slightly out of place in drawing the impression. This was pressed back into place, and a perfect plaster impression of the roof of the mouth was obtained. The wax impression had carried the plaster into every part of the vault, thus leaving a perfect impression, without the strain upon the straggling teeth which occurs in the removal of all-plaster impressions.

Dr. George Evans explained a simple method of forming all-gold bicuspid or molar dummies for bridge-work. A seamless gold crown of suitable size is first trimmed at the neck to the desired form; fluxed prepared solder filings are placed on the inside of the gold cap and melted, in considerable quantity. A piece of thin platinum, or gold plate, is then fitted over the orifice of the neck of the cap or crown, clamped thereto, and heated to a point sufficient to melt the solder in the interior of the cap, and enable it to flow down and unite the metal at the neck and flow over its surface. A hollow, hermetically tight gold dummy is thus formed, which can be used the same as a solid one, but is much lighter and less expensive. Dr. Evans also explained methods for applying and altering ready-made gold crowns.

Dr. A. S. Richmond's cable suspension dental engine for electric motors, which he exhibited in running order, consists in the arrangement of the bracket-crane fastened to the wall. The crane at about a foot distant from its anchorage is provided with a joint for an up-and-down position, and has also a slip extension to regulate the length of the crane as may be desired. At the end of the crane is an endwise joint and a steel rod slipping into a tube connecting with the motor-head, to which the cable-sheath and hand-piece are attached. The idle pulleys or crane-rods are adjustable to any desired position on the rod, and there fastened by thumb-screws. The engine-head case or barrel is about four inches in length and fourteen and one-half inches in diameter, with a balance-weight inclosed, which gives force and steady motion to the cable and hand-piece. There are two high and low motions, the right and left swinging of crane, and the rotary motion of hand-piece, and there is, therefore, no slacking of engine-cord, which is always taut from the weight of the engine-head, when once put into proper position. The entire construction is simple and compact. The electric motor used is the "Lundell," which is placed on a bracket attached to the wall.

Drs. M. L. Rhein and C. L. Andrews exhibited specimens of removable bridge-work without mutilating the crowns used as abutments. They exhibited the work in the different stages of construction, as illustrated in the DENTAL COSMOS for March, 1894.

Dr. R. C. Brewster brought a number of children, from five to eight years of age, from an orphanage in the city of Brooklyn, and solicited opinions as to the best methods and materials for filling their teeth. Approximal cavities in deciduous molars were unanimously recommended to be filled with gutta-percha, bridging the space; the first permanent molars with amalgam ; for cup-shaped cavities that could not be excavated, nitrate-of-silver treatment was advised. Dr. Brewster showed, in the mouth of a patient, a filling of base-plate gutta-percha inserted in a first permanent molar three years ago, which is still in good condition. It was the general expression of opinion that the care of children's teeth is a serious problem, and the presence of so many little patients formed an interesting feature of the clinic.

Dr. David Genese, of Baltimore, Md., treated and excavated a lower first molar, capping and filling at the same time. The cavity was large and the tooth hypersensitive. Dr. Genese demonstrated the obtundent effect in this case of his preparation of carbolate of cocain, the formula for which is :

℞—Cocain, 4 per cent. ;
Carb. acid, 50 per cent. ;
Benzoin, gum, 50 per cent. ;

by the aid of which he excavated the tooth painlessly. Then combining the obtundent with oxid of tin, forming a sticky paste, he capped over the nearly exposed pulp, and over this placed a layer of oxyphosphate cement, finishing the filling with a surface of amalgam. Dr. Genese also cut down a decayed second superior bicuspid, and, applying his obtundent, extracted the remnant of the pulp, sealed the apex of the root, and mounted a "Genese crown." This form of crown has a platinum lining. The pin for anchorage is made of iridiumized platinum, rolled from plate into a cone, and milled so as to roughen the surface. The crown having been ground into position and the pin fitted fairly tight into the root-canal, a piece of wax is placed in the crown and the same pressed into place, so as to secure proper alignment. The crown and pin are then removed and invested, then soldered together with pure gold, or other soldering material, and then adjusted.

Dr. Geo. F. Reese, of Brooklyn, N. Y., demonstrated the method of adjusting his gold alloy cast crown.

A right superior lateral root was selected in a lady patient. He had the root all ready prepared ; then the artificial crown, which was a plain rubber tooth, was ground to fit to the root and gum ; next a piece of platinum wire, coated with gold the length of the root, was hammered flat at the exposed end and bent into a foot-shape. It was then fastened by wax to the artificial crown, and an impression of the root was taken. This was put in and removed a number of times, the surplus taken off with a heated spatula, until adaptation and contour was correctly obtained down to the finest detail. It was then placed in cold water to harden the wax, and tried in again. Everything being found satisfactory, two points of wax were put on the back of the crown, which was then invested in plaster of Paris. After hardening, the wax ends were grooved out, the matrix heated, and the wax melted out by a fine stream of boiling water. Two pockets were then made, one being the pouring, the other the vent gate. This was again invested in plaster, which was now ready, after hardening and standing a couple of hours, to be put in the drying oven. When dry, which is shown by the mirror test, the gold alloy was melted and heated until it turned a purplish tint, when it was ready to cast.

The doctor, after finishing, proceeded to insert a duplicate crown. By so doing, it was shown that the crown fitted perfectly. He then permanently fastened it by drying out the root and coating the crown-root with oxyphosphate cement (Weston's).

The principal claims made for this style of crown are, first, that the perfect adaptation obtained by means of the gold alloy restores a sluggish root to healthy action ; second, we have the entire range of plain teeth to select from ; third, there is as much strength as in any other method ; fourth, the crown has stood the test of twelve years.

Dr. H. A. Parr introduced his new automatic engine-mallet, with which he impacted gold in two bicuspid fissure cavities, using Pack's cylinders. He first applied the rubber-dam and excavated the teeth. The whole operation, from first to the final finishing, occupied about twenty minutes, taking but thirteen minutes for the introducing and packing of gold. The mallet is about the size of an ordinary hand-piece, and comparatively noiseless in its action, striking a uniform blow. The force of the blow can be graduated, by the turn of a collar on the sleeve, from a feather-weight to that of any desired weight.

Mr. J. N. Leaming, of Philadelphia, exhibited a variety of rubber and corundum plug-finishing disks, wheels, and points, made from molds, and mounted on mandrels so as to insure their running true. They can be used dry, and will not clog from friction, but it is best to run them wet. The disks will cut on the edge without crimping.

Dr. T. W. Onderdonk, of New York, described his method of adjusting Logan crowns, and showed a root-clamp of his devising. His method is to adjust the rubber-dam on the root, grind crown to fit approximately, and then, by means of special instruments, wafer, trim, and adjust the wafer of gutta-percha to the end of the root, having first smeared it with varnish. The crown is pressed to place, the gutta-percha trimmed at the margins, and the attachment made with oxyphosphate cement. Dr. Onderdonk inserted a right superior second bicuspid for Dr. W. H. Meyer in the manner described.

Mr. W. H. Evans, of McKesson & Robbins, showed their various forms of pyrozone in solution of three, five, and twenty-five per cent., the three per cent. being an aqueous solution, and the other preparations a solution in sulfuric ether. The three per cent. is recommended as a mouth-wash in combination with a tablet of soda mint.

Dr. C. A. Meeker, of Newark, N. J., bleached, in the mouth of a patient brought by a physician, an upper bicuspid which presented a much darkened appearance. After first wiping out the cavity with carbonate of ammonia, to neutralize possible acidity, he used pyrozone, twenty-five per cent., on a swab of bibulous paper, evaporating it by repeated blasts from a hot-air blower.

Dr. C. C. Linton, of New York, exhibited a number of sealed-glass tubes, prepared for the purpose of showing the contractility of amalgams according to Fletcher's test with an aniline solution in alcohol. From about two dozen specimens of amalgam thus subjected to test during a period ranging from three days to as many weeks, the alloys of Welch, Oliver, Harris, of Baltimore, and that of R. S. Williams, showed no shrinkage.

Dr. W. R. Vail, of New York, showed his method of making celluloid cases, and exhibited a number of specimens, among which were two of the first plates manufactured by the Celluloid Company, which, on being contrasted with those now supplied, showed a considerable improvement in the latter. An important point which Dr. Vail laid particular stress on is the quality of plaster used for models, ordinary builder's plaster giving a much harder surface than the finer dental impression plaster. After flasking a case, he places it in the Campbell new mode heater, which he heats up to 320° F. before putting on any pressure, and then gradually increases it until the flask is closed. The cases shown for illustration were a set of teeth in the flask before packing, one in the rough as just removed from the flask, and a full upper and lower set completed.

Dr. T. O. Oliver exhibited a variety of his preparations of gutta-percha, crystal tooth-lining gum varnish, antiseptic fluid, and a local anesthetic free from cocain and carbolic acid. Also a flask parting fluid and impression coloring tablets.

Dr. D. M. Valentine, of New York, exhibited a new form of crown, having baked in it a square box of platinum for the reception of a square pin.

Dr. E. S. Gaylord, of New Haven, Conn., showed his method of keeping accounts,—day book, journal, cash book, etc., combined.

Mr. Stahl, representing Wyeth & Bro., Philadelphia, showed their preparation of red gum styptic and Dr. Seiler's alkaline tablets for making antiseptic mouth-wash.

Dr. W. M. Sharp, of Binghamton, N. Y., exhibited his portable furnace, and explained its practical advantages for baking porcelain work from an inlay to a continuous-gum case, also for casting aluminum cases, melting metals, soldering cases or preparing them for soldering. The furnace shown was a very compact affair, and will doubtless be a valuable acquisition to a dental laboratory.

Dr. F. Milton Smith, of New York city, demonstrated a method (for which he makes no claim for originality) for serrating mallet-pluggers in an emergency. The plugger point is first softened by heating to a very red heat, and covered up with asbestos or ashes until cool. Then with a fine file the old serrations are removed, being careful to leave a perfectly flat surface. A very fine cut plate-file of six or eight inches is laid flat on the bench or table. It will be observed that for a short distance from the handle end the file cuts are only in one direction, so that if the plugger point is held perfectly straight up and down and shoved lengthwise of these cuts, the points may be very nicely serrated. Should the serrations not be deep enough, it will be necessary to file them off and serrate again. Then temper by heating to cherry-red, and plunge in mutton-tallow.

Dr. W. H. Mitchell, of Bayonne, N. J., exhibited his spring clamp disk-carrier, which consists of a mandrel having a center pivot. The mandrel revolves in a center cap that presses the disk in the mandrel, which is held firmly in position by means of a spring clamp which also acts as a shield. The doctor also exhibited a new Bunsen burner that will not take fire below, but will burn perfectly.

Dr. W. S. Elliott, of Trenton, N. J., presented a modified form of the Bonwill mechanical mallet, whereby it was made applicable to the Elliott suspension engine. He demonstrated its working by filling a molar tooth, using No. 10 cohesive foil. Those present who were familiar with the suspension engine, as well as others, were highly pleased with the simplicity and efficiency of the device.

Dr. T. A. Fletcher, of New York, described a method of root-filling, as follows:

The advantages of a solution of gutta-percha in cajuput oil for root-filling may be briefly stated as follows: The preparation remains in solution longer than chloro-percha; is antiseptic in common with the other essential oils; is non-irritating if forced through the apex, being antiphlogistic; and, last but not least, it seems to have the property of expelling, or uniting with, the moisture and adhering perfectly to the walls of the canal.

It is thus possible to perfectly fill the root even though it has not previously been made absolutely dry. The advantages of a material which will make a perfect root-filling in the presence of moisture will be readily apparent to every practitioner.

Mr. John Kerr, of the Detroit Dental Manufacturing Company, demonstrated the working and use of the Downie porcelain furnace, and exhibited specimens of a system of crown- and bridge-work. These furnaces, made in three sizes, are suited for doing all kinds of porcelain work, and having a platinum muffle the danger of gassing is entirely overcome. The time required for heating up and fusing is so short that it makes this class of work very much more practicable for ordinary dental practice than the tedious method of heating up the old-fashioned furnace.

This system of making crowns will overcome many of the objectionable features of the crowns heretofore in use. With a platinum band or cap we are able to get a more perfect adaptation to the root. The anterior portion of the band is covered with porcelain the same color as the facing, so there is no metal whatever showing, and no necessity of cutting the root off far above the gingival margin and lacerating the gum. The porcelain fuses perfectly to the back of the facing, therefore there is not the liability of the facing breaking off; and as there is no metal backing used, we retain a perfect match and the translucency of the tooth. Any plain tooth may be used. In making these crowns with the ordinary porcelain body, the facings will become etched, or rough and pitted, and on being handled will have black specks over its surface, thus marring its appearance. This is entirely overcome by using Downie's porcelain body, which fuses at a temperature below the fusing-point of the enamel on the teeth, therefore they come out of the furnace as smooth and perfect as they were before baking. This body is prepared in twenty-four colors and shades, so there will be very little trouble in getting a match. The same general idea can be applied in bridge-work.

Dr. F. C. Barlow, of Jersey City, described the use of the Spyer cohesion forms, as follows: My manner of procedure to obtain a perfect surface of the vacuum of the Spyer plate is to cut the plate as required to fit it to the impression, avoiding all crimping and doubling up by cutting out a V-shaped piece or pieces and bringing the edges nicely together, pressing with great care so as not to bruise in the least the metal form, thereby flattening out or crushing the cells or corrugations of the plate, also making sure that it touches the surface of the impression at every point. Plaster is then mixed to the proper consistency and poured into the mold, which, after drying, is removed, and the form-plate will be found adhering to and covering the face of the model, a perfect die, reproducing perfectly in the vulcanized plate.

If the impression is of wax, the form-plate will adhere without the aid of any cement; but if of plaster, rubber or any other fluid cement will answer the purpose of retaining it in position by attachment around the outer edge only. It is claimed that these forms can be utilized for metal work, but my experience has proven that for such use they are perfectly worthless.

Dr. Edward D. Frost, of Elizabeth, N. J., exhibited a crowned tooth, showing the two-fold use to which he puts the guide-pin.

This pin, which is placed midway between the root-canal and the palatal surface of the root, is extended an inch or more, as may be convenient, beyond the gold cap, to facilitate handling of the pin and cap. The pin is designed to remain in position until the crown is invested for soldering, when it is cut off flush with the gold cap.

By using the guide-pin in this way, the crown is more easily and quickly handled.

Dr. E. Parmly Brown, of New York city, did an extensive contour operation on a left upper second bicuspid, using cohesive gold and the electric mallet in connection with his new tooth-bracer, which he claims is a most valuable invention, making the use of the electric mallet practicable with a heavy enough blow to thoroughly condense heavy gold on the most frail teeth, even in the hands of operators inexperienced in its use, under which conditions the electric mallet has often proved impracticable. The tooth-bracer is a peculiarly formed device composed of pure tin, and is of a shape that will admit of its being held against the tooth operated upon to take nearly all the force of the blow, and thus prevent all jarring and discomfort to the patient, at the same time permitting such impaction as to insure a more dense and perfect condensation than could otherwise be attained. Dr. Brown also demonstrated the use of his new hand mallet in connection with this tooth-bracer, also his depressed rubber-dam and universal screw-clamp and new form of gold. He also showed his heroic chisels and other new inventions, such as the disk-cleaning brush dish, handy box of polishing strips, etc. Dr. Brown also presented a lady patient with four porcelain bridges in her mouth,—ten teeth in all,—inserted five years ago, and all in perfect condition. The bridges were held by gold fillings in front, and composed of porcelain inside as well as outside, with no metal anywhere in sight, and resting solidly on the gum, which was perfectly clean and healthy. These bridges were shown to this society four years ago, after having been worn a year. Dr. Brown claims that the most skeptical dentist should be convinced, and acknowledge the superiority of this system of procelain bridge-work after having seen the result shown. He also presented a young girl patient, showing in her mouth a number of amalgam fillings worn two years. These fillings were in the back teeth, where Dr. Brown claims they are perfection. He advocates the use of a high-grade gold alloy, which can be depended upon, and claims that it is superior to gold in such teeth. The instruments and materials used by Dr. Brown were on exhibition by the International Dental Manufacturing Company, by whom they are manufactured.

Dr. Nelson T. Shields, of New York city, gave a thorough demonstration of permanent bridge- and crown-work not resting upon the gum, which, from its scientific construction, showed great strength, absolute cleanliness, artistic beauty, and a thorough restoration of the natural expression, by his method of backing the facings and building out with gold.

Dr. Shields also showed his method of finishing amalgam fillings, using the S. S. White Globe gold and platinum alloy, thereby demonstrating that Dr. Brown and his amalgam are no better than Dr. Shields and White's amalgam, but that perfection in an amalgam filling depends almost entirely upon the operator. Dr. Brown called for amalgam fillings to bear out the comparison, and Dr. Shields produced an amalgam filling which was beyond criticism, produced by the use of White's alloy.

Dr. E. Parmly Brown. I would like to correct a little misapprehension in regard to the gold-alloy fillings that were mentioned in the clinic report. I invited comparison, stating that the teeth were restored with amalgam. There were ten teeth so restored. Of course, no fair-minded man wants to bring a single tooth filled but three months, and compare it with a mouthful of chalky teeth in a young girl's mouth, which had been filled for two years. You might as well bring a new-born babe and compare it with Sandow, the strong man ; and I do not propose to let anything that is unjust go on record if I can prevent it. This young man brought a beautiful filling there, elegantly contoured. He is a fine operator. He knuckled those teeth together very beautifully. I told him that was correct ; but I said before he was born we were doing that very same thing, and preaching it through this country and Europe.

Dr. John I. Hart. I feel that the clinics given under the auspices of this society during the current year have been of an extraordinarily high character, and that result has only been accomplished after the expenditure of considerable time and energy on the part of the clinic committee. I would move a vote of thanks to the chairman and the members of that committee, and the clinicians who have appeared before this society.

Motion carried.

Incidents of Office Practice.

Dr. Genese, of Baltimore. Feeling that anything out of the usual order of things would be of interest to you, I have brought a model of a malformed condition of the upper maxilla, due to the premature extraction of two permanent teeth, to make room in the crowded mouth. I think the model will speak for itself. The case is that of a young lady twenty-two or twenty-three years of age, who had been sent to some one in the mountains who called himself a practitioner. He said the teeth had to come out, and there is the result. You will notice that the temporary teeth are still there. The treatment was to take out those temporary teeth, stretch the arch, replace the missing teeth by a denture, and endeavor to make a little better appearance. It is about the worst case I have ever seen.

The President. Are you positive that that is the cause?

Dr. Genese. Yes, from the history of the case. The teeth were taken out, expecting that new teeth would come in their place; but it was evident that the permanent teeth, particularly the sixth-year molars, had been extracted.

The paper of the evening was then read by R. C. Brewster, M.D., M.D.S., entitled, "Has not Tin Foil, as a Material for Filling Teeth, been Overestimated?" *

Discussion.

Dr. Bonwill, of Philadelphia. While I did not hear anything of this essay, being unfortunately very deaf, my friend next to me told me that the essayist did not believe in tin foil, and that he did not seem to give the reason why. I believe in tin, and I should take very positive grounds against him. Forty years of experience have taught me that tin has not been overestimated as a filling-material, so far as prevention of subsequent caries is concerned.

From 1854 to 1862, I used it in those cases where I did not use gold. Up to the time I came to Philadelphia, I used soft gold foil, and I built up all surfaces with that; then I did no contour work proper, save a case now and then, when I would use tin on the back teeth. I was bitterly opposed to amalgam, because the fathers said nay, and I dared not at that time rebel.

It will preserve tooth-structure on any surface where it is protected from attrition. Nothing can surpass it, unless perhaps it be pink gutta-percha, which needs renewal often. My brother, who was in this city, and for whom I filled the first teeth, when I did not even have a chair, has those same fillings in his mouth yet. It is from no peculiar quality, electrical or otherwise, that it does it, further than it is so soft and pliant that there is very little doubt as to a perfect fit being made. All capillary action is destroyed, and this destroying of the capillary action will prevent subsequent decay. It is remarkable how little pressure is needed to make it lay against the walls. Gold will do the same thing, but you all know that there are many reasons why gold cannot always be used, and why it should not be used, even if it could be. I learned to pack tin solidly and perfectly forty years ago, with nothing but a short-pointed instrument, sharpened on one side. I have some of those instruments yet. With that I made all my early packing; but it was too much for human hands to do. I could not afford to waste my life on that. While I learned to work it perfectly, yet, with all its good features I found it would not do for contour. Just like the celebrated English copper amalgam, which will blacken a tooth and blacken your reputation, and will not last.

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* Dr. Brewster's paper will be found at page 347 of the current number.

With the introduction of power malleting, the use of gold assumed importance to a magnified extent. Finally, the Tower of Babel which so many of us reared toppled over, and the indiscriminate packing of gold became unjust and unwise. While I could build well, it was not safe to go to such extremes. Although I could make the tin perfectly solid, the contour would not hold. It would wear away. I bade it adieu, except now and then using it to see if I had forgotten how to handle it. While I have gone almost exclusively to hard or cohesive foil, I never neglect the occasional use of soft foil to see if I have forgotten it. All my early work I did with soft foil, and with smooth points.

For preserving tooth-structure, there is nothing better than gutta-percha. You can do it with other things, but look at the difference! I used tin, and I gave it up because it took so much strength and power, and I took to the mallet. At one of your meetings some one, in speaking of the value of tin, suggested that it be made up in blocks and shaved from a lathe. I do not wish to be considered as claiming not only the earth but the moon and the entire planetary system, as one of my friends said was characteristic of me, but I have here to-night two things that I used during 1838 or 1840 which will show you what was done at that time, when I lived in the country, far away from any city advantages. I have with me an iron plane, made thirty-eight years ago, that I had made for the purpose of planing gold. At that time I was not guilty of attending solely to dentistry, but also had other work to do. In an experiment in the town where I lived, in making the first binder to a wheat machine, I was told of a certain nut a man had made, and instantly there came to me another nut, far simpler. I spoke to him about it, and he said, "Suppose we join hands," and we did, and worked together. That led me necessarily into the experiments of making pulleys and different things. I had a pewter pulley in my lathe, such as it was. I saw in an instant, as soon as the shavings came off, that that was what I wanted for filling teeth. I got a piece of tin and shaved down some. I then took all the old pieces of pure gold that I could scrape together, and I will show you the result, and the advantages that the shaving of gold has. Here is a gold coin, Mr. President. Upon its surface you will find two nuggets that I packed in, done with gold shaven from a large nugget. In the beating of gold, the crystals are more or less thrown out of the shape which they normally assume. With a rough instrument, which I then had, I did not even scratch the surface. It is a thing that ought to have gone on the market long before these other methods came out, but I had a great many other things to do, and one thing after another prevented me. I had not the money, and I lived in the country; but after all these years, you see the result of this early experiment. I will show you the old plane that I used in the early experiments. I have nothing further to say about tin, except that I am still its friend, and if the essayist had had the experience which I had many years ago, he would not desert one of his old friends. The date of the coin I showed you is 1836.

Dr. Genese. I cannot date back as far Dr. Bonwill, but I can go back thirty-one years, and my experience with tin foil in this country, France, and England has been considerable of a failure, inasmuch as the teeth attempted to be saved by its use would not at all times bear the enormous pressure that Dr. Bonwill says it requires to pack tin foil. The matter of the cervical border being preserved by tin, in the way the essayist states, I doubt from experience. Like a great many other experimenters, I tried to overcome it. Where the tin is worn away, I have succeeded somewhat with a preparation of equal parts of gold, tin, silver, and zinc ; but the method of using these metals in combination is somewhat peculiar, and requires considerable care. They cannot, as you know, be melted together, and the best way to get the combination of the metals is to file. First cast an ingot of each of the metals, file them up as fine as possible, mix them with mercury to form them into a paste separately, then put them into a crucible, cover them with common salt, and subject them to a heat which will drive off the mercury and leave the metal without a particle of loss, ready to pour into an ingot. This is more easily mixed with mercury,—more easily than anything else,—sets very rapidly, and is of an exceedingly fine crystallization, and withstands the action of the acids formed at the margins better than any other method. Gold fillings and tin fillings that have disintegrated are more easily repaired in this way than any other. Any gentleman having a scrap of gold, getting a little pure silver, and having tin and zinc, can make it himself. I intended to bring an ingot, but, having sickness at home, I was not able to cast it. However, I brought teeth which I filled at Old Point Comfort. They keep their color, they will stand a strong acid without discoloration, can be contoured and finished at one sitting, and will far surpass any tin filling that I know of.

Dr. S. C. G. Watkins. I have heard discussions on tin foil for a long time, but while I have practiced dentistry for nearly twenty-five years, this is the first time I have ever heard read a paper derogatory to tin foil. I was quite surprised to-night to hear Dr. Brewster treat of tin foil in the way he has done. It is impossible for us to know, of course, why he has had such results. In using tin foil alone, simply as tin foil, I know very little about it ; I have practiced that very little. But in combination with gold there are two things which should be observed in order to make the filling dense and have each piece cohere or become thoroughly attached or incorporated into or with the other piece, so as to make a dense filling. A deeply serrated instrument is required. I apprehend from Dr. Brewster's paper that he used mostly finely serrated instruments or broken points. I think a coarsely serrated instrument is the proper point for tin filling. In the use of tin foil in connection with gold, there should be a greater quantity of tin than gold in the filling. With a smaller quantity of tin than of gold, the result is almost sure to be a failure. That is a fact which I have not heard pronounced, but which I have noticed continually in my practice. I have heard many times that the cervical walls should be protected with tin. I think in nearly all cases where I have used a small amount of tin at the cervical walls, it has been a failure. There has been some action there, electrical or chemical, which has destroyed that tin, and left a vacant space between the gold and the cavity wall ; but where a larger amount of tin than gold is used, the result is exactly the opposite, and instead of the tin becoming destroyed, it takes on to itself more the form of amalgam, becomes very hard, and does make a thoroughly good filling which certainly saves the tooth-structure.

Dr. Genese. The specimens I passed around were made to demonstrate this system, when we met at Old Point Comfort, in 1887. They were pressed into a tooth that was dry at the time. They have been in my cabinet at home ever since, mixed with all sorts of things, and you can see the effect it has had on the surface of these metals. There is a molar tooth there that was made with the pieces that were left over. For repairing the cervical borders, where the gold or tin has worn away, it is very valuable. There is no chemical action visible after filling the tooth with this material. It is very simple to make, and if you keep it in a stick, as you make it, it is much better than having it in filings to dry up. There is hardly a vestige of shrinkage. I would call that a gold amalgam, because I believe there is more gold in it than anything else. There is twenty-five per cent. of gold, twenty-five of silver, and the same of tin and zinc. It makes a perfect combination, but it is in the preparation that care should be taken. You cannot mix them without subdividing them and mixing them with mercury. If you are using a large quantity, take care that the chimney of your crucible goes outside, as the fumes of the mercury would be dangerous. Cover the crucible with salt. The salt will not melt, and you can pour it without getting it chilled. I have been using it for over six years, and it has given great satisfaction.

Dr. Hodson. Do you find no objection to the zinc in it?

Dr. Genese. None whatever.

Dr. Bonwill. I was upon the clinic program to-day, to give a new method of practice. To the report given I must add one other point. While there was no subject for me, there was one thing more than anything else that would make it impracticable and unjust to me, and not the best for those present, to go into a matter like that, unless I had the ear of the audience for at least half an hour. It is a subject upon which I have never written. I have spoken of it wherever I have been, but I have never written about it. If I have done anything of any value, and that enhances life to me at this time, and gives an easier position to me, it is that one thing, and if at any future time—if it be of interest to this society—they want to discuss a subject like that, I will be pleased (inasmuch as you have asked me to clinic for you) to come before you, before the summer.

Dr. Walker. I move that a cordial invitation be extended to Dr. Bonwill to continue the subject before us.

Seconded and carried.

Dr. E. A. Bogue. I do not know where Dr. Bonwill has been, but the notes I have on my little paper here have all been spoken of by him, and much better than I have written them myself. The only difference that is made is, that on my paper I have written that a perfect filling, made even with brown paper, would preserve a tooth. I feel moved to ask, Mr. President, whether the essayist of the evening has been in the habit of using gold over a thin foundation of exposed tin. I did not quite understand his paper, as to whether he did or not.

Dr. Brewster. In completing a filling with gold that had been started with tin, I would say yes.

Dr. Bogue. Dr. Watkins, who acknowledges that he sometimes does very bad work, and that it fails (few men would have the honesty to do that), has struck the key-note in saying that a small amount of tin inserted with a large proportion of gold has in his practice always failed. All my fillings put in that way fail too. Wherever a thin foundation of exposed tin has been made with a gold filling on top, I think the essayist of the evening might expect a failure in every instance, so long as the galvanic current exists. It took a long time for the power loom to come into use over the hand loom, and so it took a long time for us to understand the advantages that exist in contour fillings. It is being better understood, however, and while few have taken the trouble that Dr. Bonwill has to make contour fillings of tin, it has been very generally noticed that even flat tin fillings, when perfectly put in, have been of wonderful efficiency. Contouring removes a great many cavities from their adaptability for tin, but it leaves all those flat surfaces just as well adapted for tin as ever they were, and when tin is used advantageously, it is not because it has chemical qualities, but because it has mechanical. When tin fillings preserve teeth, it is because they are good fillings, put in well, and not because of any magic qualities in the tin itself. If, to paraphrase the essayist's very nice summing up, we use judgment as well as tin in filling teeth, we shall only put it in buccal cavities, flat cavities, in grinding-surface cavities, and nowhere else.

Dr. B. C. Nash. I have noticed in reading the journals of several years ago, when there seemed to be a "revival" of the use of tin and gold, that one of the most peculiar features advanced by its advocates was that the most favorable conditions for such fillings were under what would ordinarily be considered the most disadvantageous circumstances. The method was to first swab out the cavity with carbolic acid, and then without drying or making any particular effort to exclude saliva, to insert the filling as expeditiously as possisible by the wedging process ; the claim being made that any deficiency of contact with the cavity margins would be supplied by a chemical deposit on the filling-material, that would "fossilize," so to speak, the vulnerable points of the cavity. Dr. Brewster, in attempting to make perfect fillings, has evidently departed from the methods described, to which he may possibly owe his defeat ; but he doubtless is consoled by the knowledge that success has followed thoroughness of manipulation in his use of other materials.

Dr. Brewster. Dr. Bonwill I understood to say does not want to kill himself by the use of tin fillings, and that he has been compelled to discontinue them for the use of gold, which he intends to use, with his mallet, for the rest of his life. I claim there are other things that will save teeth as well as tin. Dr. Watkins admits that when tin is laid at the cervical border of the cavity, it will decompose. It is the sulfids in the serum that cause this decomposition. Dr. Bogue states that whatever filling will hermetically seal a cavity will preserve the tooth, therefore what advantage has tin over any other material that will do the same ?

Subject passed.

A special vote of thanks was tendered to Dr. Brewster for his interesting paper, and to Drs. Bonwill and Genese, and the other gentlemen who took part in this evening's meeting and at the clinics.

Adjourned.

At the annual meeting, held April 10, 1894, the following officers were elected for the ensuing year:

Victor Hugo Jackson, president; James W. Taylor, vice-president; Benjamin C. Nash, secretary; John H. Meyer, treasurer; and J. Bond Littig, librarian. Delegates to the Dental Society of the State of New York: George Evans and George H. Rich, each for four years, and M. L. Chaim for one year.

B. C. NASH, *Secretary.*

VERMONT STATE DENTAL SOCIETY.

AT the eighteenth annual meeting of the Vermont State Dental Society, held at White River Junction, March 21–23, 1894, the following were elected officers for the ensuing year: Dr. W. H. Wright, Brandon, president; Dr. E. O. Blanchard, West Randolph, first vice-president; Dr. F. A. Mather, Chester, second vice-president; Dr. T. Mound, Rutland, secretary; Dr. W. H. Munsell, Wells River, treasurer; Drs. C. W. Staples, G. A. Wheeler, J. A. Robinson, executive committee; Dr. G. W. Hoffman, White River Junction, state prosecutor.

Drs. W. R. Marsh, of Brandon, and A. L. Williams, of Windsor, were made active members of the society, and Drs. C. H. Gerrish, of Exeter, N. H., and G. P. Wicksell, of Boston, honorary members.

The following resolutions were adopted on the death of Dr. A. N. Jackson:

WHEREAS, Our brother, Dr. A. N. Jackson, of Hardwick, has been removed from our midst by death:

Resolved, That we, the members of the Vermont State Dental Society, extend to his family our heartfelt sympathy in their affliction;

Resolved, That a copy of these resolutions be sent to his family and to the dental journals for publication.

GEO. F. CHENEY,
J. A. ROBINSON,
CHAS. F. MEACHAM, } *Committee.*

The next meeting will be held at Brandon, Vt., on the third Wednesday in March, 1895.

THOMAS MOUND, *Secretary.*

ARIZONA DENTAL ASSOCIATION.

ON March 27, 1894, the Arizona Dental Association was formed with a membership of sixteen. Dr. L. H. Goodrich, of Phœnix, president; Dr. J. M. Marshall, of Flagstaff, vice-president, and H. J. Jessop, secretary and treasurer.

The next meeting will be held at Tucson, on October 24, 1894, at which place the examination of applicants to practice dentistry in Arizona will be held.

H. J. JESSOP, *Secretary.*

CHICAGO DENTAL SOCIETY.

At the annual meeting of the Chicago Dental Society, held in Kindergarten Hall, April 3, 1894, the following officers were duly elected for the ensuing year: J. H. Woolley, president; C. E. Bentley, first vice-president; D. M. Gallie, second vice-president; H. H. Peck, recording secretary; H. A. Costner, corresponding secretary; E. D. Swain, treasurer; J. J. Whaley, librarian; J. N. Crouse, director.

H. A. Costner, *Cor. Sec.*

MISSISSIPPI STATE BOARD OF DENTAL EXAMINERS.

At the annual meeting of the Mississippi State Board of Dental Examiners, April 3, 4, 5, there were thirteen applicants, the successful candidates being J. R. Moore, W. P. Davis, W. O. Tolbert, A. B. Kelly, A. T. Pierce, and J. E. Johnson.

The system of the Illinois State Board, as recently published in the *Dental Review*, was adopted, and worked very successfully. No oral examinations were held, however, additional lists of questions being prepared on oral surgery, prosthesis, and orthodontia.

Each applicant who passed the written examination successfully was also required to clinic, the first time that this has been attempted by the Mississippi Board.

W. E. Walker, *President.*
Geo. B. Clement, *Secretary.*

DENTAL SOCIETY ANNOUNCEMENTS.

THE MIDWINTER FAIR DENTAL CONGRESS.

The Midwinter Fair Dental Congress will be held at San Francisco, Cal., from the 11th to the 15th of June, 1894, both dates inclusive.

All the reputable legal dentists of the nine states and territories of the Pacific slope, together with those east of the Rockies who wish to join with us, are expected and urgently requested to attend this meeting, bringing with them any and everything that may be of interest to the profession; come prepared to give rather than to take.

Interesting papers and clinics are promised from leading men, both east and west.

A meeting is anticipated that will be second only to that held at Chicago last August.

The work is being carried forward by the following officers and chairmen of committees:

President, Luther A. Teague, 10 Geary street, San Francisco.

Vice-Presidents, S. E. Knowles, 139 Post street, San Francisco; J. A. W. Lundborg, 219 Geary street, San Francisco.

Treasurer, W. A. Knowles, 118 Grant avenue, San Francisco.

Secretary, W. Z. King, 1001 Valencia street, San Francisco.

Assistant Secretary, C. W. Hibbard, 202 Stockton street, San Francisco.

Corresponding Secretary, C. E. Post, 14 Grant avenue, San Francisco.

CHAIRMEN OF COMMITTEES.

Executive, S. H. Roberts, 120 McAllister street, San Francisco.
Finance, Harry P. Carlton, Crocker Building, San Francisco.
Program, Walter F. Lewis, 462½ 13th street, Oakland.
Editorial, J. D. Hodgen, 1005 Sutter street, San Francisco.
Membership, T. N. Iglehart, 713 Sutter street, San Francisco.
Invitation, L. L. Dunbar, 500 Sutter street, San Francisco.
Reception, J. A. W. Lundborg, 219 Geary street, San Francisco.
Local Arrangement, F. C. Pague, 819 Market street, San Francisco.
Dental Club, W. J. Younger, 300 Stockton street, San Francisco.
Advisory, Thomas Morffew, 702 Market street, San Francisco.
Association Day, A. F. Merriman, Jr., 1003½ Broadway, Oakland.
Publication, F. Teague, 21 Powell street, San Francisco.
Transportation, R. H.Cool, 1115 Broadway, Oakland.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

THE twenty-sixth annual meeting of the Dental Society of the State of New York will be held in the city of Albany, N. Y., May 9 and 10, 1894.

F. T. VAN WOERT, *President*, Brooklyn, N. Y.
C. S. BUTLER, *Secretary*, Buffalo, N. Y.

The Board of Censors of the Dental Society of the State of New York will hold its annual meeting for examination at Albany, on Wednesday, May 9, at 10 A. M. The law provides that "said society shall admit to its examinations, provided for in section eight of this act, only the following classes of persons, upon satisfactory proof of good moral character:

"First. All duly licensed and registered dentists of this state.

"Second. All persons coming from other states or countries who shall present to said society satisfactory proof of having been lawfully engaged in the practice of dentistry without the state for the term of six years.

"Third. All such persons as shall have studied dentistry for a term of four years in the office or offices of some reputable and duly licensed and registered dentist or dentists of this state, and shall have in other respects conformed to the regulations governing such examinations, which regulations not inconsistent with this act said society may make and must publish at least twice in each calendar year in a leading dental journal."

The regulations require each applicant to bring a certificate of good moral character and professional standing from the District Board of Censors of the district in which he resides.

Applicants from without the State of New York must bring such certificate signed by the president and secretary of a reputable dental society in the state from which they come.

Candidates will be examined in anatomy, physiology, histology, pathology, therapeutics, oral surgery, materia medica, chemistry, metallurgy, operative and mechanical dentistry.

MICHIGAN DENTAL ASSOCIATION.

THE annual meeting of the Michigan Dental Association will be held at Ann Arbor, June 6, 7, 8, and 9, 1894.

J. WARD HOUSE, *Secretary*,
Grand Rapids, Mich.

COLORADO STATE DENTAL ASSOCIATION.

THE Colorado State Dental Association will convene in Denver the first Tuesday in June, and hold its session three days. A large attendance is desired, as important business will come before the association, and it is expected a delegation will be sent to the California convention, to be held in San Francisco, June 11 to 16. A cordial invitation is extended to members of the profession to meet with us.

SARAH MAY TOWNSEND, D.D.S., *Cor. Secretary*,
Denver, Col.

The Colorado State Board of Dental Examiners will hold a meeting for the examination of applicants to practice dentistry in that state, June 6, 1894, in rooms 519 and 520 McPhee Building, Denver, Colorado, commencing at 10 A M.

J. N. CHIPLEY, *President*, Pueblo.
C. N. GUYER, *Secretary*, Denver.

GEORGIA STATE DENTAL SOCIETY.

THE twenty-sixth annual meeting of the Georgia State Dental Society will be held at Hotel Tybee, Tybee Island, Ga., June 13 to 16, 1894.

All members of the profession are cordially invited to meet with us.

O. H. McDONALD, *Cor. Secretary*,
Griffin, Ga.

WISCONSIN STATE DENTAL SOCIETY.

THE next annual session of the Wisconsin State Dental Society will be held at Janesville, Wis., commencing Tuesday, July 17, and continuing to the 20th.

A cordial invitation is extended to the profession to be present.

C. A. SOUTHWELL, *Secretary*,
411 National ave., Milwaukee, Wis.

CHANGE IN DATE OF THE NEW JERSEY JULY EXAMINATIONS.

THE New Jersey Dental Commission will hold their summer examinations at No. 88 Broad street, Elizabeth, N. J., commencing on the second Tuesday in July, instead of the third Tuesday, as heretofore.

Applications should be in the hands of the secretary by June 26.

G. CARLETON BROWN, *Secretary*,
88 Broad street, Elizabeth, N. J.

SOUTH DAKOTA STATE BOARD OF DENTAL EXAMINERS.

THE regular annual meeting of the South Dakota State Dental Examiners will be held at Parker, South Dakota, on June 13 and 14, 1894. Any who may desire to present themselves for examination as to their qualifications in dentistry, also graduates who desire to register in this state, are requested to give thirty days' notice, with remittance of the fee, which is ten dollars, to the secretary, at Yankton, South Dakota.

W. H. H. BROWN, *Secretary*.

SOUTH CAROLINA STATE DENTAL ASSOCIATION.

THE twenty-fourth annual session of the South Carolina State Dental Association and of the State Board of Dental Examiners will be held at Charleston, S. C., commencing on Tuesday, May 8, 1894, at 12 M.

EDITORIAL.

THE RELATIONS OF DENTISTRY TO MEDICINE.

ONE of the topics offered for discussion at the World's Columbian Dental Congress was the query, What relation shall dentistry bear to medicine? It is to be regretted that, owing to the lack of time and pressure of other matter, this subject failed of a hearing. We have frequently discussed in these pages various phases of the relations of dentistry to medicine, avoiding, however, any attempt at formulating definite propositions with respect to what that relationship should be; because at present it is practically impossible to arrive at a satisfactory definition, by reason of the complexity of interests involved, and the consequent lack of any considerable unanimity of opinion on the subject among those most competent to judge of the case fairly on its merits. A correspondent, with somewhat definite views, has expressed his opinions upon the subject in a recent letter called forth by the editorial upon "Scientific Work in Dentistry" in our previous issue. He asks, "How can you expect scientific work to be performed within the narrow limits of our profession when it is confined to the limits of our dental colleges, a large proportion of whose faculties are made up of inferior men, and whose teaching is on a par with their limited experience? We can never expect to do original scientific work until the student has received a broad, liberal education, so that after he enters practice he can overlook the narrow bounds of his specialty. . . . Any advance of science, in the dental specialty, must be made through a medical education." As to the final assertion we are inclined to ask, Why? And regarding the initial query, we would ask, What have the limitations of dentistry to do with the scientific or unscientific pursuit of it?

There are unfortunately men engaged in the practice of dentistry who are ashamed of the fact that they are dentists; it is these men who, fascinated by the glamour of superiority with which their imaginations have clothed the medical graduate, belittle their calling by characterizing it as a trade, devoted to the manufacture of red rubber plates and amalgam fillings. The question as to whether a profession or calling is a scientific one has to do, not with the material basis of that calling, but with the method of its pursuit. In whatever degree dentistry falls short of being a scientific profession, it is where the scientific method is not applied to its practice, investigation, and study. Certainly the nature of the data and phenomena with which the dentist has to deal have absolutely no determining power as to whether dental practice shall be carried on scientifically or empirically ; these are determined by the mental habit of the practitioner. The content of the term scientific can only be expressed as a psychological function, not as a property of matter. In this view, then, the limitations of dentistry have nothing whatever to do with the amount of scientific work possible within them ; whatever these may be they are individual and personal, therefore the question is simply one of so educating dental students that they will develop a scientific habit of mind, and apply the scientific method to the problems which they are called upon to solve with respect to their professional work. If our colleges are deficient in this regard, let them be improved ; but we doubt if the dental instruction given in our reputable colleges compares unfavorably in this particular with that given to medical classes.

The "narrow limits" of dentistry have been alluded to. It would be interesting to know where the lines which limit dentistry are to be drawn. There are, of course, almost as many views upon the subject as there are observers ; but considering all its recognized ramifications, does not dental practice include within its legitimate limits a larger field than any department of medicine? How, then, can there be any lack of opportunity for scientific work in dentistry? The great need is for men competent to do it ; our correspondent says it can only be done by men of broad, liberal education. Within certain limits this is true, but more depends upon the nature of a man's education than the extent of it, in fitting him for original scientific work.

The assertion that a medical education is the essential prerequisite, the *sine qua non* for original work in dentistry, is as absurd a proposition as the reverse of it. The best scientific work in dentistry has not been done by medical men. A medical education is a valuable aid to such work, just as any added knowledge is ; but it will not of itself make a scientific investigator, either of a dental or medical practitioner. Dentistry has grown by the development of a field heretofore neglected and overlooked by the practitioner of medicine. Each day witnesses, through the labors of dental original investigators, a stronger emphasis placed upon the importance of the relations of dental and oral pathology and therapeusis to the general system. The middle ground between dentistry and medicine is being closed up by the efforts, not of medical men, but of dentists ; and this same territory, which was once occupied by neither, but was by courtesy accorded to medicine, is being reclaimed for dentistry.

What the future relations of these branches of the healing art may be, probably cannot be foretold ; but if a closer relationship shall occur, it will be because of the growth of dentistry toward medicine, and not the reverse. This may mean the widening of the dental curriculum to include all the fundamental branches of medicine ; but that it will mean the inclusion of the dental in the medical, or the acquirement of the medical degree preliminary to the study of dentistry, we strongly doubt. Such a plan has often been tried, and it does not produce the best dentists. This proposition we have in a former issue presented at length.

A closer harmonization of dental and medical practice is needful alike for dentists and physicians. Each has, as a rule, a lamentably meager conception of the importance of the other's work. To bring about such a relationship through the educational methods now in vogue in our colleges would require an amount of time and of upsetting of accepted methods of instruction which present a formidable obstacle to such an achievement. There is, however, one important means to the desired end which should be cultivated to the utmost,—viz, the more general association of dentists and physicians in their scientific society work. The establishment of the section in Dental and Oral Surgery of the American Medical Association is a step in this direction, valuable as far as it goes, which furnishes all needful precedent for the further application of the principle which it involves. The work of that organization falls short of the possibilities of such an arrangement by reason of its meetings being held annually. A much greater advance would be possible if the same idea were applied to local meetings which are held monthly or oftener. It is meetings of this class which afford the best opportunities for educational results. The members are brought into closer contact, personal friendships are established, more work is done, and mutual understanding and regard are increased by the frequency of the meetings.

Most, if not all, dental societies open their doors to graduates of medicine, though it is questionable if sufficient emphasis has been placed upon the desirability of having physicians take an active part in dental meetings by presenting subjects for discussion upon which their opinions would shed valuable light. The admission of dentists to an active participation in local medical societies has not been, thus far, as favorably regarded by those in authority ; the indications are, however, that changes will be made in this regard. The Pathological Society of Philadelphia has now under consideration an amendment to its by-laws looking to the admission of dentists in good and regular standing to full active membership on the same plane as its medical members. The cultivation of this principle will do more in a practical way to settle the relationships of medicine and dentistry than any other means now possible.

We hear too much of the imperfect, the partial culture of the dentist. Compared with what it might be, there is no doubt ground for improvement; but while we recognize our imperfections and endeavor to eliminate them, let us remember that though but a department of the great healing art, no other of its sisters has made a larger contribution to the common stock of knowledge; that in seeking a closer relationship to medicine she does not come empty-handed; and if in our relations to medicine we are met by some variation of the ancient query, "Can there any good thing come out of Nazareth?" let us not forget that it did once and can again.

CROWDED OUT.

SEVERAL original communications, reports of dental college commencements, and other matter in type have been unavoidably crowded out, and will appear in our next issue.

OBITUARY.

DR. WILLIAM H. EAMES

DIED, in St. Louis, Mo., March 28, 1894, after a short illness, WILLIAM HENRY EAMES, D.D.S., in the sixty-sixth year of his age.

He was born in Auburn, N. Y., August 23, 1828. His father, George Eames, soon after the birth of this son, removed to Oneida county, N. Y., where his father, James Eames, with his large family, had settled in 1794. They were progressive people, taking an active part in all public affairs, and particularly interested in educational advancement. The active interest, untiring zeal, and devotion with which Dr. Eames labored for the advancement of his profession, in the college, in the journals, and in societies was a direct continuation of the spirit with which his father and grandfather before him had worked for the intellectual advancement of the rising generation. He was educated in the public schools, and at the Clinton Academy, in Oneida county. After teaching school several years, he commenced the study of medicine with Dr. Porter, an eminent English physician, and went to Ann Arbor to complete his medical studies at the Michigan University. While there, he decided to study dentistry, and entered the Ohio Dental College, graduating in 1853. He returned to Ann Arbor and formed a partnership with his preceptor, Dr. Porter. He was married, in 1855, to Laura M. Scofield, of Clinton, Michigan, and removed to Lebanon, Tenn., in 1857, remaining there until 1862, when owing to the disturbed condition of the South he removed to St. Louis, Mo. He at once became a member of the St. Louis Dental Society, and always took an active and prominent part in the profession in St. Louis. It was at a meeting of th society at his residence that the subject of organizing a dental college in St, Louis was introduced. There were present at this meeting Drs. Judd, McKellops, Forbes, Peebles, and others, and from its first inception he was an active worker, continuing through many years to the very night before he was stricken down. He was one of the founders of the *Missouri Dental*

Journal, and for many years its editor; and later editor of the *Archives of Dentistry*, which succeeded it. Dr. Eames was an active member of the American Dental Association, the Missouri State Dental Association, and the St. Louis Dental Society; the last two of which he has been president of at different times. He had also served as president of the Association of Dental College Faculties, and was an honorary member of the Illinois, Iowa, and other state and district dental societies. It is not necessary to speak here of the genial nature and the many admirable qualities of our departed brother; these are known to all who ever had the pleasure of his acquaintance, and will be referred to as pleasant recollections until all have followed him to the other side.

The doctor leaves a wife and seven grown children, two sons and five daughters.—DR. A. H. FULLER, in the *Dental Review*.

The Chicago Dental Society, at its meeting held April 3, adopted the following preamble and resolutions:

WHEREAS, It has come to the knowledge of the members of the Chicago Dental Society that the dental profession is called to mourn the loss of one of its most distinguished and honored members; therefore be it

Resolved, That in the decease of Professor W. H. Eames the world has lost one of its foremost educators, his family a devoted husband and father, and the profession a sincere and useful devotee. It is fitting that this society should pay its tribute of respect to one who has so long and honorably filled positions before the world, and we mourn his death as a personal loss to each and all of us; be it further

Resolved, That a copy of these lines be transmitted to the family of the deceased, and a further copy be sent to the journals for publication.

A. W. HARLAN,
TRUMAN W. BROPHY,
EDGAR D. SWAIN.

DR. BENJAMIN S. CODMAN.

DIED, in Boston, Mass., February 22, 1894, of Bright's disease, BENJAMIN S. CODMAN, M.D., in the seventy-eighth year of his age.

Dr. Codman was born in Boston, February 24, 1816, where he spent his lifetime. He was the senior member of the well-known firm of Codman & Shurtleff, manufacturers of and dealers in dental and surgical instruments. He commenced his dental career about 1838, as assistant to his brother, Willard W. Codman, who was at that time in the laboratory department of Drs. Joshua and Elisha Tucker. After graduating at the Medical School of Harvard University, he entered into the general practice of dentistry.

About the year 1851, Dr. Codman bought from Joseph Burnett, an apothecary, his stock of dental supplies, and, securing as partner Mr. A. M. Shurtleff, of Boston, opened a dental depot on Tremont street, where he remained up to the date of his decease.

In 1851, Dr. Codman was married to Miss Elizabeth Loring, of Boston, who died in 1876. They had no children. Dr. Codman was formerly an active member of the Massachusetts Dental Society. It will be noticed that had he lived two days longer he would have completed his seventy-eighth year.

There have been five dentists in the Codman family,—the brother of deceased, Willard W. Codman (whose name has not before appeared in dental necrology), who was born in Boston in 1811, and died of angina pectoris, December 14, 1886; the son of the latter, Dr. Henry J. Codman, who followed dentistry, but since deceased; his student and nephew, Dr. J. T. Codman, of Boston, with his son, Benjamin H. Codman, D.M.D., both now in active practice.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING MARCH, 1894.

March 6.—No. 515,816, to ARTHUR W. BROWNE. Dental engine.
" " No. 516,092, to GARNETT L. HILLS. Mirror.
" " No. 516,120, to CHARLES F. RUTTERFORD. Artificial tooth.
March 13.—No. 516,310, to HENRY L. KNIGHT and HOBERT E. DUNCAN. Dental impression-cup.
" " No. 516,401, to I. G. H. NICHOLSON. Inhaler.
" " No. 516,409, to CHARLES C. SOUTHWELL. Toothpick.
" " No. 516,465, to FREDERICK H. BERRY. Dental engine.
" " No. 516,529, to FLORIAN E. HANSEN. Dental articulator.
March 20.—No. 516,700, to CHARLES A. DAVIS. Dental vulcanizer.
" " No. 516,766, to FREIDRICH KRAFFT and ALFRED ROOS. Process of making ether.
" " No. 516,841, to WILHELM SCHEERER. Inhaling apparatus.
March 27.—No. 517,151, to GEORGE A. TOMPKINS. Process of manufacturing dental plates.
" " No. 517,218, to ANDREW J. HARRIS. Dental engine-head.
" " No. 517,248, to RUFUS G. STANBROUGH. Angle attachment for dental hand-pieces.
" " No. 517,249, to RUFUS G. STANBROUGH. Angle attachment for dental hand-pieces.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

REMARKS ON THE COMMUNICATION OF DR. RÖSE.*

BY W. D. MILLER, M.D., D.D.S., BERLIN.

HAVING made known the results of my experiments on the impregnation of unextractable pulps or parts of pulps, in a paper read before the World's Columbian Dental Congress at Chicago, and in a second one published in the Transactions of the Odontological Society of Berlin (October *Sitzung.*, Bd. V, Heft 3, 1893), I did not design to return to this subject again until further practical experiments had been accumulated. The paper by Dr. Röse, however, calls for a few remarks in reply, to prevent various misunderstandings which might otherwise result from it.

In order to bring my views as already published before the reader, I will quote a few paragraphs from the Transactions of the Odontological Society, which will also be found in essentially the same form in an extract in the DENTAL COSMOS, 1893, p. 803: "I am convinced that the impregnation method depends to a very great extent upon the character of the antiseptic employed and upon its chemical action upon the pulp apart from its antiseptic action. The qualities desirable appear to me to be:

"1. Strong antiseptic action.

"2. Sufficient solubility and diffusibility to permeate all parts of the pulp.

"3. It must not be so readily soluble as to be taken up entirely by the tissues and finally disappear altogether, as is the case with applications of carbolic acid, etc.

"4. A coagulating action upon the pulp appears to me to be desirable, if not directly essential. A pulp which is converted into a hard, dry string is less liable to furnish food for bacteria, and to offer irritation to the periapical tissue than a pulp in a semifluid condition.

"5. It is desirable that the substance employed should have no irritating action upon the pericementum.

"6. It must not form any combination with the pulp or bring about any change in the same by which irritating substances may be produced. I look upon this condition as a very important one. In every treatment we have to reckon with an unknown factor, inasmuch as we cannot say with certainty what will become of the pulp in the course of time, or whether it will remain non-irritating to the pericementum. One probable cause of the failure of Baume's borax treatment is the conversion of the pulp into a semifluid, soapy mass with a strong alkaline smell and reaction, which can hardly be indifferent to the tissue about the foramen.

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* DENTAL COSMOS, May, 1894, page 358.

"7. It should not discolor the tooth, although as the treatment concerns chiefly molars, a slight discoloration need not be considered as a very serious matter.

"8. Solid substances are preferable to liquids."

The substances recommended by me were salts of mercury in combination with thymol, of each 0.0050 or 0.0075. Lately I have adopted sublimate, 0.004; thymol, 0.006.

Further I wrote:

"Recently I have been hunting for substances which possess the necessary properties without discoloring the tooth. Up to the present I have obtained the best results with diaphtherin (oxyquinaseptol)."

The use of the oil of cinnamon for the same purpose is fully discussed in my communication. With reference to thymol I wrote: "After the substances mentioned above, I would turn my attention to salicylic acid and thymol. In point of penetration and antiseptic action they are much inferior to sublimate, etc., but they fulfill some of the other conditions far better than sublimate."

In respect to the impregnation method in general I wrote:

"I cannot say that I have too much hope for its future, nevertheless I believe that it might result in a blessing for the tooth-suffering public in case we were able to find the substance best adapted for the purpose."

Finally: "We should not be hasty in the application of methods of this nature; one or two cases every month, at least for the first year or two, is all that a careful dentist ought to risk in private practice."

In regard now to the paper of Dr. Röse, many of the points made by him are familiar to us all and universally recognized; some, however, admit of considerable doubt, and some are invested with inferences which do not justly follow from them. His interpretation of the various results obtained by the method of Baume no doubt applies to many cases, but certainly not to all. Guttmann (*Verhandlg. d. deut. odontol. Gesellsch*, Bd. II, Heft 4, 1891), who reports over seventy-five per cent. of failures in ninety-four treatments, was a pupil of Baume's, and understood perfectly how to choose his cases.

Dr. Röse's views regarding the chronic irritation kept up by particles of putrid tissue in the root-canals we all adopt without question, except that a tooth is not to be looked upon as quite the same thing as a foreign body. His reasoning regarding the chronic irritating action of antiseptics in root-canals is, on the other hand, entirely of a theoretical nature.

The action of sublimate on the pericementum will depend in a very large measure upon the manner in which it is applied and the amount used. If we apply a tablet containing 0.0040 gram (= 0.06 grain or $\frac{1}{16}$ grain) of sublimate to the stump of a pulp, what becomes of it? A part remains where it is placed attached to the dentine or to gold foil; a second part impregnates the pulp and forms the insoluble albuminate; a third part permeates the dentinal fibrils; a fourth part goes through the apex and is absorbed ; a fifth part is reduced to calomel (possibly to the suboxid of mercury or metallic mercury) ; a sixth part traverses the dentine and cement, and reaches the pericementum in such large quantities that its absorption is impossible. It there keeps up, according to Röse's deductions, a chronic irritation from which the tooth never recovers. We have neither theoretical nor practical proofs which would justify such a conclusion. The quantity of sublimate which eventually finds its way to the pericementum after the application of $\frac{1}{16}$ of a grain will probably be zero. It could scarcely in any case exceed $\frac{1}{100}$ of a grain. Besides, we have it in our power to reduce the amount of sublimate still further if it should be found that the quantity is more than is necessary to thoroughly impregnate the pulp.

Adolf Witzel has had more experience in the use of sublimate in the treatment of diseased pulps than any other. As is known, he formerly used the twenty per cent. alcoholic solution. This he pumped into the canal, evaporated the alcohol by means of warm air, and repeated this process till the canal was filled with solid sublimate, introducing a quantity which I should estimate as possibly fifty times that which I have used. He writes me that he has not even then observed chronic irritation caused by the sublimate.

We all agree perfectly as to care and cleanliness, and as to the adoption of general surgical principles in the treatment of root-canals, as far as the last mentioned is possible ; but I know of no surgical operation which we could take as example when we seal up putrescible matter in the human body in a place where its resorption is next to impossible.

In comparing the use of strong antiseptics in the root-canals of teeth to shooting at sparrows with cannon, Röse is completely ignoring some very elementary facts in the bacteriology and pathology of diseased teeth.

Röse comments upon the fact that surgeons do not flood open wounds with strong antiseptics. The reason is well known to us all. Antiseptics often injure the living tissue as much or more than they do the bacteria. This fact does not justify the conclusion that it is "mistreatment" to apply strong antiseptics to a *dead* pulp. If it is so, then inserting a nerve-broach into a root-canal, twisting off the dead pulp's neck at the foramen and dragging the pulp out bodily, is murder in the first degree.

The reserve which I urged in regard to Herbst's method, as well as in regard to the impregnation method, will be granted to be in place by experienced operators in general. The wholesale application of new methods of any kind which must be acceded to be of untried nature is to be condemned.

My views regarding the use of scherbenkobalt were expressed in both articles referred to at the beginning of this communication. What advantage is there in using an impure preparation of uncertain strength when we have a pure preparation at our command, which we can dilute *ad libitum* if we wish a milder action?

When Röse recommends leaving the paste for several days in the tooth in order to sterilize the pulp, he is employing to that extent the impregnation method. Whether he by that means gets the whole pulp sterile or not depends upon the quantity of carbolic acid he uses, and how long he leaves it in. The amount of carbolic acid commonly used in applying arsenic paste is so small that an impregnation of the deeper parts of the pulp by it is out of the question. My investigations on this point will be found in full in the DENTAL COSMOS, 1890.

Whether a pulp is really sterile or not can only be conditionally determined by culture experiments, since many of the pulp-bacteria do not grow on artificial media. Culture experiments from even putrid pulps occasionally turn out negatively. More than this, granted that the pulp becomes sterilized by the application, this does not say that it remains sterile indefinitely. The failure of arsenic to conserve the pulp which it has killed has been established by thousands of experiments in practice.

I would not recommend any one to follow Röse when he treats devitalized teeth without coffer-dam and under access of saliva. In so doing he has quite deserted the surgical principles that he advocates in the beginning of his article. He furnishes no proofs in support of the statement that amputated pulps as a rule become absorbed.

We are well aware of the fact that infection of the pericementum through the circulation occurs in the vast majority of cases only where traces of dead matter are present at the apex of the root. If this dead matter is in a condition which will render the proliferation of bacteria impossible, the chances of an infection through this medium will be reduced to a minimum. A chronic chemical irritation would, *ceteris paribus*, increase the susceptibility of the pericementum to infection, but such an irritation is not, as Röse seems to suppose, a necessary adjunct of the impregnation method.

Röse's affirmation that the goal of my endeavors is found in the application of the most powerful antiseptics is not accurate. I nowhere call for the *most* powerful antiseptics. Even a strong antiseptic action is put down as only *one* of the desirable qualities. I have included all possible dental antiseptics in my investigations.

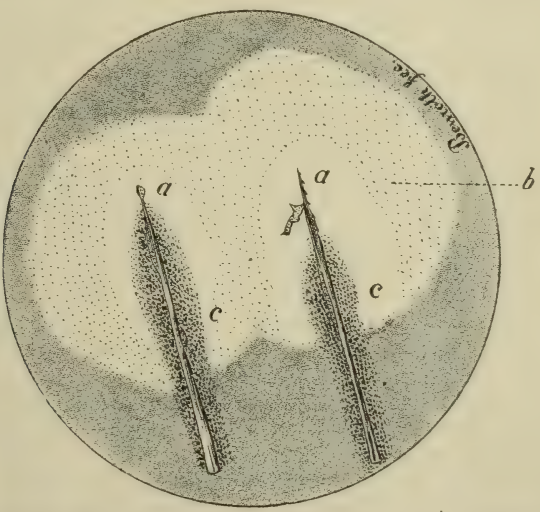
Thymol, which Röse regards in a very favorable light, was first mentioned by me as a possible material for impregnating pulps.

The statement that I have no faith at all in Herbst's method, and, anyway, little hope in the future of the impregnation method, is also not quite accurate. I said, "I have *little* faith in Herbst's method, and *not too much* in the impregnation method," a reserve which I believe was quite in place.

Herbst's method, which Röse designates as a modification of the impregnation method of Witzel and Baume, has itself undergone considerable changes. At first Herbst recommended treating even putrid conditions of the pulp by boring out the pulp-chamber and rotating in tin. Later he restricted this operation to pulps devitalized by cobalt, using no antiseptics whatever in the treatment. Bödecker introduced washing out the cavity with a solution of sublimate. Röse now recommends leaving the paste in the cavity some days in order to impregnate the pulp with the carbolic acid; he also moistens the tin with an antiseptic solution. These innovations are in the main certainly commendable; it only requires one step more to complete the circuit, and we arrive again at the impregnation method.

My reason for retaining sublimate, in spite of its disagreeable qualities, among the materials which I have indicated as worthy of a trial, will be found in the fact that sublimate forms with the pulp an insoluble or but very slightly soluble albuminate of mercury. This albuminate is, according to Behring, as powerful an antiseptic as sublimate itself. We have the root-canal accordingly filled with an insoluble antiseptic, which, it seems to me, is an exceedingly favorable condition, certainly more so than when we have it filled with putrescible pulp-tissue. The aim is, of course, to apply enough sublimate (in conjunction with thymol) to impregnate the pulp and perhaps a thin layer of dentine around the canal. The idea that the whole of the dentine, cement, and pericementum must become soaked in sublimate is altogether wrong.

In July, 1893, I treated an upper first bicuspid with a sublimate-thymol tablet, about 0.004 of each. In October I removed the filling to determine what state the pulp might be in. The pulp from both canals *came out very readily in one piece* as a stiff, grayish-black acicular body, smelling of thymol. These pulps were dropped upon an infected agar culture, which in two days presented the appearance seen in the figure. *The tooth showed no discoloration whatever, nor has any appeared since.* The marked action of the tablet in this case renders it probable that we may be able to accomplish the desired end with still smaller quantities; for example, sublimate, 0.003; thymol, 0.005. This reduces the sublimate to $\frac{1}{22}$ grain. I do not think there is any reason to attempt to go below this.



a, *a*, nerve-broaches with pulps at point; *b*, region of plate kept sterile by the action of the pulps; *c*, *c*, precipitate of the hydrated oxid of iron along the broaches.

As far as the good results reported by Röse are concerned, we all know that new methods give brilliant results in the beginning, so that I do not attach much importance to these statistics. I may say, however, that not all who have tried the Herbst method have been able to report one hundred per cent. of success.

I shall repeat here what I have often said before, that the impregnation method is not designed as a substitute for the extirpation method, except in the cases specified in my article. Among the more opulent classes its application should be restricted to those very inaccessible cases where the extirpation of the pulp can be effected only by a sacrifice of a large amount of tooth-substance, and even then with the result so often seen even in those practices where *all canals* are *perfectly* filled to the apex (?), chronic irritation or fistula.

How conservative I myself am, will be seen by the fact that in the last four years in my private practice I have employed the impregnation method but seven times.

Case 1.—Left inferior third molar, buccal; decay extending below gum. Tablet of sublimate and common salt. (December, 1890.)

Case 2.—Right superior second molar, distal. Tablet of sublimate and salt. (October, 1891.)

Case 3.—Left superior third molar, distal. Applied 0.004 sublimate with boric acid. (April, 1891.)

Case 4.—Left superior second molar, distal. Impregnated pulp with oil of cinnamon. (February, 1893.)

Case 5.—Left inferior third molar, buccal; decay extending under gums. Sublimate and thymol. (June, 1893.)

Case 6.—Right inferior second molar, posterior. Extirpated pulp of distal root. Applied tablet of diaphtherin to stump in mesial root. (October, 1893.)

Case 7.—Right inferior third molar, distal. Patient unable to open the mouth properly. Sublimate and thymol. (December, 1893.)

These teeth are at this time all giving perfect satisfaction except Case 5. The patient says that he sometimes *knows that he has a tooth there.* In three or four cases not included in the above I have soaked the cavity for ten days or two weeks with oil of cinnamon, opened up the entrance to the canals, and introduced a very small piece of a tablet (containing about 0.001 gram sublimate) into each opening, covering this with gold foil. I am not sure but that we may find this in certain cases to be better practice even for our opulent patients than guttering the crown of the tooth and poking about in narrow canals until we start up an irritation of the pericementum, in order to deceive ourselves by the thought that we have removed the pulp.

In conclusion, the whole matter may be put into a nutshell as follows: No dentist who has an appreciation of the needs of the public at large and does not confine his sphere of thought to the limits of his own practice (with fifty dollars to one hundred dollars for treating a tooth) can question the statement that our present methods of treating many molars with dead pulps are difficult, expensive, and in the hands of the majority, uncertain.

The only alternative of extirpating the pulp is leaving it in. (The cases where this is advisable have been repeatedly stated.) Having left the pulp in the canal, shall we leave it in the shape of putrescible matter, or shall we endeavor, in some way, to render it non-putrescible? The latter method appears to me to be the more rational. I am far, however, from refusing to accord all deference to an impartial presentation of the opposite side of the question, such as was given by Christensen in the DENTAL COSMOS, 1893, page 363. It is, in fact, fortunate that investigations do not all run in the same line; for by being able to compare results we increase the chance of arriving at more perfect methods. I have here presented simply my own convictions, supported by considerable experience and many experiments, and can only say that if I were to have a dead pulp sealed up in my own tooth, I should feel safer if I had a suitable antiseptic at the back of it.

My communication before the congress at Chicago does not seem to have been clearly understood,—at least none of the remarks, except those of Dr. Cunningham, following the reading of my paper had any relevance to the subject. In particular, Schreier's complaint that his kalium-natrium treatment was not referred to shows a complete misconception of the scope of the paper, which dealt only with methods of leaving the pulp in the tooth. No reference was made to any of the scores of methods, including Schreier's, employed for taking it out.

AN IDEAL FILLING.

BY SIGEL ROUSH, M.D., D.D.S., WASHINGTON, D. C.

An ideal filling must first be durable ; second, it must be free from the power of contraction or expansion ; third, it must be a non-conductor of heat, cold, or electricity ; fourth, it must be a non-irritant ; fifth, it must be an inert material, incapable of forming harmful compounds with either the natural secretions of the mouth or with any substance that may be brought in contact with it ; sixth, it must not exert a deleterious effect on the adjacent tooth-substance ; seventh, it must be of such material that not only perfect adaptation to the walls of the cavity may be obtained, but absolute union with the tooth-substance secured ; eighth, it should be sightly ; ninth, it should exercise a preservative influence upon all dental structures ; tenth, it should be inexpensive.

We do not possess an ideal filling ; for as yet one or more of the above-mentioned requisites are lacking in any one of the filling-materials now used by the dental profession. But let us see how nearly we approach such a substance. At present the approximate ideal filling will depend upon the structure of the tooth, location of the cavity, and temperament of the patient. No one material can be used indiscriminately to obtain the best possible results. In a strong tooth with firm walls, perhaps gold properly inserted will prove the most preferable filling of any we now have at our command ; but these teeth are rather the exception than the rule, and the writer heartily reprobates the careless and indiscriminate use of gold as a filling-material. He believes that gold has destroyed more teeth than it ever saved. In the first place, gold in the hands of a careless and unscrupulous operator will meet with universal failure ; in the hands of the most careful and conscientious dentist it will fail in all cases of loose-structured and pervious teeth, because it is impossible to secure in these cases a hermetical filling. No material that depends simply upon perfect adaptation will make an impervious filling in a tooth that will admit moisture through the unsealed structural interstices adjacent to the cavity. In these teeth the filling-material, in order to be successful, must extend beyond the cavity-walls proper, and penetrate and seal all the interstitial openings in the immediate vicinity. Gold, with amalgam and other materials of this class, fails in this particular. Adaptation, however perfect, will not permanently arrest decay in porous, loosely constructed teeth. In gold we have many of the qualifications necessary to an ideal filling, but the most important of all for the permanent preservation of the tooth—viz, a perfect and absolutely hermetical union with the dental substance—is lacking, which makes it the most treacherous of all filling-materials.

Amalgam will do far less harm in the hands of the average operator than gold ; carelessly inserted, the former will insure better results than the latter. Amalgam, everything considered, is preferable in most cases to gold. It can be adapted more readily to the cavity, is easily manipulated, is supposed in certain varieties to exert a preservative effect on soft, cancellous tooth-substance, and is comparatively inexpensive. On the contrary, it is unsightly, subject to thermal and electrical changes, and at certain stages contracts or expands. It therefore fails in several respects in being an ideal filling. So also with tin, gutta-percha, and others of this class mainly dependent upon adaptation to arrest decay. However, in the cement fillings—oxyphosphate, oxychlorid, etc.—we possess one of the most important of all requisites to an ideal filling-material,—viz, the quality of hermetically sealing a cavity and forming an absolute union between the dental substance and the filling-material. But it is to be regretted that cement is short-lived. At best it is only a temporary filling. Yet it is the only filling that will save for any length of time a great number of teeth that would be lost irretrievably with any other substance, and while it is perhaps one of the most important of all known materials, it has, nevertheless, this one great objection.

It is not in any one of these substances that we most nearly approximate an ideal filling, but, in the opinion of the writer, the very best results are obtained by using them in combination. The penetrating and sealing qualities of cement make it an almost indispensable auxiliary in the majority of cavities. It is therefore the practice of the writer to line most cavities with cement. This lining should be very thin : for the thinner the layer of cement the less probability of its washing out or being disintegrated by the fluids of the mouth. If amalgam is to be the finishing material, it is pressed in place while the cement is yet plastic, as by this means a more perfect union is obtained between the two filling-materials. The dam should always be used, and the cavity thoroughly dried and rendered aseptic before beginning to fill. When completed, we have the very best possible filling for all kinds of teeth. Of course in the oral teeth amalgam cannot be used, but if the teeth are porous a sealing layer of cement before inserting the gold will be found invaluable. In case of using gold, the writer allows the cement to harden, then with an excavator or bur removes all but that portion actually impacted within the walls of the cavity. Where teeth are too frail to retain gold, of course cement is used for the entire filling. Porcelain set in cement, esthetically considered, is superior to gold or amalgam, and if skillfully done makes one of the best of fillings. But where the location permits, amalgam or gold worked into a lining of soft cement will approximate most nearly an ideal filling. When the pulp is encroached upon, a protective must be used ; for, good authority to the contrary notwithstanding, oxyphosphate and oxychlorid are irritants, and will, when brought near enough to the pulp-chamber, eventually destroy the tooth's vitality. For this protective purpose a coat of sandarac varnish with an intermediate of gutta-percha answers admirably.

With cement in conjunction with gold or amalgam, we have a filling that offers but few objections. With a non-irritating cement and an amalgam, sightly and free from thermal and electrical changes, we can command a perfect—an ideal filling.

DISQUALIFICATION FOR MILITARY SERVICE IN THE CIVIL WAR ON ACCOUNT OF LOSS OF TEETH.

BY EDWARD BUMGARDNER, M.D., D.D.S., LAWRENCE, KANSAS.

In the selection of men for military duty, it is the object of all governments to obtain only those who will be able to perform arduous service and to endure the hardships of prolonged campaigns. A high standard is required in time of peace, and this standard is never lowered unless war reduces the country to the necessity of enlisting men who, under ordinary circumstances, would be exempted for partial disability. Fortunately, the war of the rebellion did not force our government to this extremity. The reports of the examining surgeons were less complete for examinations held early in the war, but it was meant to keep the standard the same throughout the war. This uniformity makes the official reports especially valuable as furnishing statistics in regard to the ratio rejected. We have good reason to hope that we shall never have occasion to ascertain accurately the available military strength of our country, but the facts recorded by the examining surgeons may be used to advantage in the warfare of science against disease. The numbers rejected for the various diseases and disqualifications, with their relation to age, nativity, locality, occupation, etc., are classified in a report which was issued from the Provost Marshal General's Bureau in 1875. This report contains facts of much value to the dental profession, and the attempt here is to make the most important of them accessible to all.

Among his instructions for the examination of a drafted man or substitute, the surgeon was directed to ascertain "whether he has a sufficient number of teeth in good condition to masticate his food properly, and to tear his cartridge quickly and with ease. The cartridge is torn with the incisor, canine, or bicuspid teeth." Section 20 of paragraph 85, "Revised Regulations," was more explicit, stating that men should be rejected who had suffered "total loss of all the front teeth, the eye-teeth, and first molars, even if only of one jaw." All dentists will agree that this was a very conservative standard. The *total loss* of a smaller number of teeth than here indicated interferes with proper mastication, and subjects the patient to diseases dependent upon insufficient trituration of food. Still, we find that of 806,610 men examined, 12,904, or 1.599 per cent., are reported as having been rejected under the section quoted. Of 501,002 drafted men, 9646, or 1.925 per cent., were exempted for this reason. It was claimed that some drafted men had teeth extracted in order to be exempted. Dr. David Noble, of Ohio, in his report, stated that "one man exhibited *twelve sound teeth* that had been recently extracted, thus settling the question that a man may stand the steel, but fear the powder and lead." But a number of surgeons reported that they "refused to exempt any whose alveolar processes were not absorbed, or whose gums indicated that the teeth had been recently extracted," although they had no proof that the men had voluntarily lost their teeth in order to secure exemption. So we may conclude that the number exempted fairly represents the number who had lost the twelve designated teeth from natural causes. Of 305,608 volunteers who were examined, 3258, or 1.066 per cent., were rejected.

It is evident that all these men were anxious to pass the examination, and expected to do so, since none would apply who did not hope to be accepted. Making allowance for those who did not present themselves for examination because they knew that their missing teeth would cause them to be rejected, and for those who, "having no teeth, went to the dentist and had sets made on vulcanized rubber, the color of which nearly corresponds with the color of the gums, and which are well calculated to deceive" (Dr. E. C. Richardson, Mass.), and who thus succeeded in passing the examination, it is not probable that the actual ratio of volunteers who had lost twelve teeth in one jaw was less than that given for drafted men. Most of the surgeons interpreted their instructions literally, and many men were accepted who were practically toothless. Dr. T. F. Murdoch, of Maryland, said, "I have often been obliged to hold a man from being the unfortunate possessor of an incisor or bicuspid, who, had he been able to get a false set, would have relieved himself of it years before." And Dr. C. I. Neff, of Ohio: "I am satisfied that many men have been held to service who were unable to properly masticate their food."

It is safe to say that more than two per cent. of the men of military age in the loyal states had lost enough teeth to prevent proper mastication. It must be remembered that these were men "between the ages of twenty and forty-five years," and that the ratio of toothless was much less than it would have been had all ages and both sexes been considered. In general, a greater proportion was rejected in the eastern states than in the western, although but one surgeon in the United States reported that he had rejected no one on account of missing teeth. In the thirteenth district of Illinois 917 men were examined and none rejected for this cause. These facts show the general prevalence of diseases of the teeth, but the detailed reports of examinations made during the latter part of the war indicate that the truth is not half told in the statistics already quoted.

The Medical Branch of the Provost Marshal General's Bureau was not established until January, 1864. After that time the examinations and reports were more systematic and complete. Dr. J. H. Baxter, the chief medical officer, was thereby enabled to prepare remarkably complete tables showing the results of the examination of 334,321 men, both drafted and volunteer. These show the relation of age to the loss of teeth as follows:

Age.	Number Examined.	Number Rejected.	Percentage.
Under 20	58,952	68	.1153
20 to 25	78,639	647	.8227
25 to 30	56,711	1,114	1.9643
30 to 35	45,777	1,783	3.8950
35 to 40	50,456	2,887	5.7218
40 and over	43,786	3,801	8.6809
Total	334,321	10,300	3.0809

But the most interesting statistics to the dentist, as indicating the causes for the loss of teeth, are in the tables presenting the relation to occupation. In considering these figures, causes for certain peculiarities in the ratios may occur to the mind. A dentist having a number of teeth missing would probably call attention to the fact, and the surgeon would be likely to examine the teeth of a dentist more carefully than those of the average recruit. Still it is not creditable that the second highest ratio for lost teeth was rejected from the ranks of the profession whose duty it is to preserve teeth. For economy of space only the percentage of the number rejected under each occupation is given, but the numbers examined were fairly representative of the occupations mentioned :

Occupation.	Percentage Rejected.
Agents	9.1111
Architects	6.3492
Bakers	5.6709
Barbers	2.8602
Bar-keepers	3.2070
Blacksmiths	2.1294
Boatmen	1.5635
Book-binders	2.4931
Brick-makers	2.5404
Brokers	7.5949
Butchers	3.2443
Cabinet-makers	3.3898
Carpenters	3.6031
Carters and Drivers	2.7737
Clergymen	9.6910
Clerks	4.6650
Carriage-makers	4.5763
Cooks	1.8065
Coppersmiths	1.6393
Dentists	10.2226
Distillers	3.0108
Druggists	7.3955
Editors	5.4795
Engravers	5.5215
Engineers	2.7826
Factory hands	2.1895
Farmers	3.2017
Firemen	1.3619
Fishermen	2.3115
Grocers	8.5818
Gunsmiths	2.7897
Harness-makers	3.4103
Hatters	4.3609
Inn-keepers	9.2990
Iron-workers	1.5080
Jewelers	5.2295
Laborers	1.8061
Lawyers	5.8743
Liquor-dealers	2.1429
Lumbermen	3.8418
Machinists	3.4152
Manufacturers	6.3512
Masons	3.6669
Mechanics	2.6003
Merchants	10.4070
Millers	6.2910
Miners	2.1375
Musicians	.7229
Ostlers	2.9104
Painters	3.2560
Paper-makers	5.0473
Peddlers	4.0435
Photographers	4.5775
Physicians	9.6356
Plasterers	3.0695
Plumbers	1.3393
Porters	3.3186
Printers	1.6715
Public Officers	7.5829
Railroad Men.	3.4075
Sail-makers	2.2624
Sailors	1.2583
Servants	2.1237
Shoemakers	2.8344
Soldiers	1.7642
Stone-cutters	1.8339
Students	1.0358
Tailors	3.7316
Tanners	1.5504
Teachers	4.3692
Telegraphers	1.9417
Tinsmiths	2.1333
Tobacconists	1.9857
Upholsterers	3.2787
Watchmen	8.3942
Other occupations	2.9685
Total	3.0809

Undoubtedly this table shows with much accuracy the comparative tendency to dental decay in the occupations named. It is not the present purpose to discuss the effect of civilization or its concomitants upon the teeth, but to present a series of reliable facts ; and in accounting for many of these facts a consideration of the habits of life, and of the kinds of food commonly used and the manner of its preparation, will be necessary. These things are affected to some extent by locality ; and the difference in ratios rejected according to states or districts would throw light upon the subject, though perhaps less than the next table, which classifies more than half a million men according to nativity. Besides food and habits, the character of those who migrate must be borne in mind. This may also account for the greater prevalence of dental diseases in the eastern states. It is to be regretted that some nationalities were not better represented. Our curiosity is aroused to know how many Indians or Portuguese would have been examined before one was rejected on account of the loss of teeth :

Nativity.	Number Examined.	Number Rejected.	Percentage.
U. S., white	315,620	10,043	3.1820
U. S., colored	25,828	222	.8595
U. S., Indians	121	0	....
Total U. S.	341.569	10,265	3.0052
South America	79	1	1.2658
West Indies	580	3	.5172
England	16,196	458	2.8279
Ireland	50,537	668	1.3218
Scotland	3,476	66	1.8987
Wales	1,104	15	1.3587
France	3,243	77	2.3743
Holland	989	14	1.4156
Germany	54,944	1,079	1 9638
Sweden	1,190	12	1.0084
Norway	2,290	9	.3930
Denmark	383	3	.7833
Switzerland	1,802	48	2.6637
Spain	148	1	.6757
Portugal	81	0	....
Italy	339	6	1.7699
Russia	122	1	.8197
Hungary	89	2	2 2472
Poland	171	4	2.3392
Total	501,068	12,966	2.5877

The evidence that the negroes and Indians had better teeth than the whites is unquestionable. It is not claimed that the same relations would be presented in all cases by similar data secured for the present time. We trust that the advance of dentistry during the last third of a century has improved the teeth of the white race. Private observation indicates that freedom has not improved the teeth of the negro. But most of the conditions which caused teeth to be lost thirty years ago are still in existence. Are we studying those conditions as we should, and doing all in our power to secure their improvement? The ideal of dentistry, as of general medical science, is the prevention of disease.

NON-COHESIVE GOLD CYLINDERS: HOW AND WHERE TO USE THEM.

BY DR. L. C. F. HUGO, WASHINGTON, D. C.

(Read before the Union Meeting of the Maryland State Dental Association and the Washington City Dental Society, April 24, 1894.)

ABSTRACT discussion in dentistry gives striking proof of the truthfulness of the old saying, "Many men, many minds." Applied concretely, this alliterative apothegm may be continued, "Many manipulators, many methods." To confine myself to but one operation in dentistry,—filling with gold,—I venture to say that while there are certain general principles followed by all operators, it is doubtful if two can be found who perform this operation in exactly the same way. If nothing more, it is at least interesting, then, to see by what different means different men successfully arrive at the same goal.

In this paper I describe a particular form of non-cohesive gold cylinders, and their use in filling certain cavities.

The question as to who was the first to prepare and use gold foil in the form of cylinders is, like many others with regard to priority, a disputed one. It is claimed that Dr. Park, of New York, used foil thus prepared in 1846. Professor James Taylor lectured on this subject at the Ohio College of Dental Surgery in 1850. But to Dr. John S. Clarke is due the credit of having first brought cylinder-filling prominently before the dental profession by publishing in the *Dental Obturator*, of New Orleans, an exhaustive paper in 1855. Though known so long, owing possibly to the troublesomeness of their preparation, cylinders did not find favor. However, since the manufacturers have relieved the dentist in this respect, there has been a steady increase in the number of operators using gold thus prepared. I have it upon good authority, that of every seven ounces of non-cohesive gold sold, three are in the form under discussion.

It is not necessary to enter upon a description of cylinders further than to say that they are rolls of sheet gold; that they range in size from one-sixteenth to one-quarter inch in length and diameter; that in consistency they are loose- or tight-rolled; and in quality, non-cohesive, cohesive, and semi-cohesive. This paper concerns itself with the loose-rolled, non-cohesive variety only.

There are two leading methods of operating with cylinders. The one practiced by Dr. Clarke I will give in his words. He says, "In filling I use my gold entirely in the form of cylinders, which are set parallel to the walls of the cavity from bottom to top, until it is apparently full. A round-pointed instrument is then forced down between them, and other cylinders inserted in the opening, decreasing the size of the instrument and cylinders until the cavity is literally full."

Dr. Clarke finished at the middle of the filling.

The method adopted by myself is this: The cylinders are placed against the distal wall in morsal or buccal cavities, against the cervical, of course, in the approximal, in such a way that one end is on the cavity-floor and the other projects beyond the orifice. Every cylinder receives lateral condensation from the bottom of the cavity to the outer margin, so that the completed filling is a mass of mutually-supporting laminæ. By this method the filling is finished at the margin.

I will now speak of the classes of cavities for which soft cylinders are suitable. Throughout this paper, when sizes are mentioned, reference is had to Pack's preparations.

Large Grinding-Surface, Buccal, or Labial Cavities.—These I fill with No. 4, cut in half-lengths, inserting with a foot- or chisel-shaped plugger. When this size, owing to the quantity in the cavity, can no longer be introduced in the vertical order, the filling is completed either with smaller cylinders, or, as I prefer to do, with Watt's crystal gold, or crystal mat gold. The filling all in, it is condensed with a fine point, mallet force. It may be objected that non-cohesive gold is not suitable when the filling is to be exposed to direct wear, as on the morsal surface of a molar. Such objection does not, in practice, hold good when applied to full-walled cavities. Condensed non-cohesive gold is about as resistive as cohesive; but as it does not unite one piece with another, if not properly introduced, it is liable to considerable flaking. This, however, is obviated when the cylinders are inserted so as to stand vertically on the cavity-floor. The wear then takes place across their ends, which, having been condensed laterally into thin edges, present but mere lines to flaking.

Approximal Cavities.—To fill an approximal cavity in a bicuspid or a molar, I proceed with the cut No. 4 cylinders in substantially the same way as just described, except that, as no favoring angle is offered, the initial pieces are tamped into place with a rubber pellet, to be spoken of later on. The cylinders lie in and out against the cervical wall, so that they reach across to the adjoining tooth if it stands reasonably near. The latter, in a measure, serves to steady the pieces as they are worked into place. As soon as I have put in a sufficiently thick body of gold to secure a good start, and to remove the danger of perforating the gold or of powdering the tooth-margin, I exert consistently heavy pressure against the whole mass, working it into the retaining-groove. The gold is then rapidly introduced in slightly concave layers, which arrangement, it is needless to say, affords the opportunity to safely make the desirable pressure against the side walls. When the cavity is about two-thirds full, the protruding ends of the cylinders are burnished down. If the space before filling was large, a strong spatula will readily pass in and accomplish the purpose just mentioned. If, however, the space was small, a saw must secure room for burnishing. After the gold has been well pressed down and over the margins, I lay into the opening thus gained a No. ½ emery-cloth strip of suitable width. I now continue with the soft cylinders, building across again, until nearly up to the morsal surface. The filling is then completed with cohesive gold, well anchored into the non-cohesive gold and into the tooth. This done, I dress down the plug with the strip already in place. (If the cloth does not slip easily, a little soaping will facilitate matters.) The non-cohesive-gold part of the filling will be readily reduced; the cohesive and the next-lying soft, however, offering more resistance. Herein lies a practical advantage for operators who believe in contouring, or in at least shaping the gold so that it will prevent the food from impinging painfully upon the gum. The approximal aspect of the filling, due to the employment of the different golds, will very easily dress itself into a quasi-contour, which, though not full throughout, yet meets this requirement—it forms a space wide at the gum, narrowing to actual contact of the gold and its *vis-a-vis* at the grinding-surface. This requirement is the essential feature of cohesive-gold contour work, and, in the latter, ordinarily involves a great expenditure of skillful, wearying effort on the part of the operator, and a great tax upon the endurance of the patient. By the method just detailed, the approximal relation of the filling to the next tooth becomes in its establishment an incident growing out of the work, without special effort, and contrasts most favorably with the laborious, time-consuming work required to build a contour with cohesive gold alone. The soft cylinders admit of rapid insertion, accurate adaptation, and easy dressing, with a minimum of exertion.

To fill *small cavities* in the *morsal*, *buccal*, and *labial* surfaces, I use Nos. 1 or 2 cylinders cut in half. The gold is inserted with a small foot-point or a straight-end instrument.

To fill *approximal cavities*, lingual presentation in the upper teeth, the cut Nos. 1, 2, and 3 may be used. The first pieces are secured against the cervico-facial part of the cavity-margin. The facial edge is then covered, care being taken that the gold laps well over. When the cavity is almost full a burnishing-spatula will condense the overlap, and the filling is then completed as described in the other cases.

The instruments I use for impacting cylinders are but few. The feature common to almost all of them is a rather broad serrated face. The serrations are deep when a single row of points forms the face ; shallow when two rows. The shape of the shank and the direction of the face vary, of course, according to position and accessibility of the cavity to be filled.

The chisel, the hatchet, and the hoe may be taken as characteristic of the shapes of my pluggers. The chisel-point is the one that in my hands has the widest range of application. With it the cylinders are impacted in cavities on the morsal and facial surfaces of upper and lower molars, and on the approximal surfaces of upper molars and bicuspids. If the shank of this instrument is bent at an angle of approximately forty-five degrees, or at ninety, the face running with the axis of the shank, it makes the two forms of hatchet-pluggers of my set. They are well adapted for disto-approximal cavities,—lower bicuspids and molars,—and for these places in the upper teeth if the mirror is employed. If the chisel-shaped instrument is bent at the angles just mentioned, but with the impacting-face traversing the axis of the shank,—that is, at right angles,—it makes the hoe-pluggers. These I use mainly in lower meso-approximal cavities, though they are sometimes applicable in the distal as well. For approximal cavities, back-presentation, in the upper front teeth, I have two sizes of right-angle points with round impacting-faces. To fill small cavities other than approximal, I use, as stated before, a straight-end or foot-point.

While speaking of the means employed in the manipulation of cylinders, I must not omit to mention the use I make of rubber pellets. I have had the service of these little aids since 1889. It is sometimes difficult to begin a filling easily and expeditiously against a broad surface such as is sometimes presented at the cervix of an approximally decayed molar or bicuspid. In such cases my procedure is as follows : I lay a large, loose-rolled cylinder sidewise against the surface in question, then place upon it an egg-shaped pellet of rubber large enough to reach across the cavity. Now with a blunt-end plugger or with the foil-pliers I press the pellet firmly against the tooth-wall covered by the gold, exerting special pressure over the retaining-groove. Upon removing the rubber there appears a perfectly adapted shell of gold. By tamping down in this manner one or two more cylinders, I secure a broad foundation and a thick mat of gold thoroughly overlapping that much-dreaded cervical margin. Into the shell may be built any kind or form of gold. Again, at times we are reduced to one-hand manipulation, as in filling labial (facial) cavities of incisors or cuspids. The trouble in making a good start here can easily be overcome by using soft cylinders with the rubber pellet. Dr. Herbst uses cotton for this purpose ; but there is danger here of fibers becoming entangled in the gold. Rubber is free from this objection. By its gentle, elastic, resilient action it literally spreads the gold into the inequalities of the cavity-surface, and on release of pressure creeps away, leaving a self-retaining shell upon which, as said before, with any kind of gold, the filling may easily and safely be continued.

I have spoken of cutting cylinders. It must be understood that I mean dividing them crosswise—at right angles to their axes. For this purpose the "clippers" made by The S. S. White Dental Manufacturing Co. are far superior to scissors, as they cut so as to leave the cylinders with open ends. Scissors condense the gold at the cut into harsh edges.

If it should be desired to work non-cohesive gold of any particular manufacture, in the form of cylinders, it is a comparatively easy matter to have it so. The old way of winding the foil about a broach is troublesome. A simpler way is this : Lay the sheet of gold upon a chamois-skin pad ; place upon the margin farthest from you the edge of a spatula (a stiff paper-cutter will do), draw carefully across the sheet, and the gold will roll up into a beautiful tube, from which may be cut pieces—that is, cylinders—of the length required. The harder the spatula is pressed upon the gold the more tightly rolled the tube will be, and of course the smaller its diameter. I do not know who is the originator of this simple but excellent way of preparing the gold.

I shall now in *résumé* mention the points of excellence of cylinders, as recognized by operators who have given this form of gold a sufficient trial.

1. Cylinders are furnished by the manufacturers so prepared as to be ready for immediate use. (I mean, of course, the soft kind.)

2. They are compact in form, and therefore easily and cleanly managed. There is no long end exposed to the danger of becoming moistened,—as in filling, without the dam, far-back teeth ; or apt to obstruct the view,—as in filling long approximal cavities.

3. They are easily picked up and carried with the plugger, no matter what its shape or face may be.

4. I doubt if there is any other form of gold with which a filling may be started so quickly and easily. Their bulk favors immediate self-retention, thus requiring but slight undercut.

5. A large loose-rolled non-cohesive cylinder laid against the cervical wall presents in one piece a continuous line of gold, which,

other things equal, makes as nearly perfect contact with that most vulnerable of margins as can be secured; and this is accomplished with a minimum of trouble. Furthermore, when thus laid the cylinder will at once cover the margin with a thick, uniform, adaptable body of gold, upon which edge-condensation may firmly and safely be made.

6. Cylinders favor the ready maintenance of a level or slightly concave working-surface. That is to say, accretion is made in layers of uniform thickness in and out. The advantages of such a surface are obvious.

7. As a corollary of what has just been said, a filling made of cylinders in a plain grinding-surface cavity, no matter how large, can never flake except in very small points. That which may be worn off the compacted ends of vertically arranged cylinders is obviously slight. A smooth finish is preserved under the roughest wear.

8. Many operators claim that cylinder gold has enabled them to reduce the time of filling from ten to fifty per cent.; such reduction having been accomplished consistently with thoroughness.

In conclusion, I must repeat that all I have said has reference to cylinders used as a substitute for other forms of soft gold. Doubtless there are many operators who use to advantage semi-cohesive and fully cohesive gold in this form. My experience with these kinds has not been favorable, therefore I have limited myself to what I know.

If there is any one present who has difficulty in working non-cohesive gold as ordinarily taught, let him try the form and method here recommended. Even if he should have but a modicum of mechanical skill, I will warrant that he can at once do successful non-cohesive gold work.

A PRACTICAL METHOD OF SOLDERING ALUMINUM.

BY NAAMAN H. KEYSER, D.D.S., GERMANTOWN, PA.

After numerous experiments with various suggested solders and fluxes, I am impressed that the real trouble in soldering aluminum is due to a film, probably an oxid, that quickly forms upon the surface and prevents contact and union of the metals. If this film is removed or broken up while the solder in a molten state is in contact with the aluminum, there seems to be no difficulty in obtaining perfect union. The conditions, though differing in degree, seem to be precisely the same in kind as when using the tin-alloy solders upon iron: there must be presented to the solder a perfectly clean metallic surface at the moment that the molten solder is applied, in order to secure union. With iron and many other metals this may be secured by chemical means, and preserved a sufficient length of time, by means of various fluxes, to obtain the desired result. With aluminum the same procedure fails, seemingly because all the fluxes heretofore suggested fail to maintain for a sufficient length of time the indispensably clean metallic surface. I find, however, that if the aluminum is heated sufficiently to keep in a molten state the tin or tin alloy used as a solder, and then, with a suitable tool, its surface immediately under the molten solder is scraped so as to remove or break up this resisting film, union immediately takes place without the use of any flux whatever. By this means the surface of the aluminum can be, to use a technical expression, "tinned," and the surfaces, thus prepared, readily united by soldering. I find no difficulty in thus soldering aluminum to itself or to other previously tinned metals. In the choice of alloys for solder there seems to be a wide latitude. Pure tin may be used; indeed, any alloy fusing at a less heat than aluminum, of which tin is a component, seems to give satisfactory results. Those melting at a low heat may be manipulated by the soldering-iron, while the blow-pipe or its equivalent is required for those fusing at a higher temperature. An alloy of tin 50, silver 25, and aluminum 25, melts at about 750°. This makes a strong solder, and promises satisfactory results for dental purposes.

Mr. Joseph Richards, of Philadelphia, has invented and patented a solder for aluminum that is claimed to have proved a commercial success. He recognizes the quickly formed film of oxid as the cause of former failures, and overcomes the difficulty by incorporating with his solder a deoxidizing agent that by reducing the oxid at the moment that the solder is fused causes the aluminum to present to the solder a clean metallic surface. The agent used is phosphorus. This solder works nicely. The solder and process are patented, the claim, dated October 5, 1891, being as follows:

U. S. PATENT NO. 478,238, JULY, 1892.

"CLAIM.—As a solder for aluminum—An alloy of aluminum and zinc having incorporated therein a reducing reagent whose affinity for oxygen is greater than that of aluminum under the condition of use, and whose oxid is substantially non-film-forming.

"Second. A solder for aluminum—An alloy of aluminum, zinc, and phosphor tin, substantially as set forth."

Arsenicum, I find, seems to have the same effect. Mr. Richards's solder, and also that which I have made having arsenicum as a component, fuses at a low temperature, and is, perhaps, at its best when used with the soldering-iron. The alloys of tin and aluminum used as solders do not seem to be definite compounds, for when heat is applied the tin exudes in globules much in the same way that mercury does when heat is applied to a pellet of copper amalgam. This tin which exudes spreads over and forms a coating upon the surface of the aluminum, over which, as the heat is increased, the less fusible constituents of the solder flow.

I have made practical use of this method of soldering aluminum in constructing a rubber attachment case, using the formula given, tin, silver, and aluminum for soldering staples, and a rim to a swaged aluminum plate, with satisfactory results. By the use of staples soldered on, a strong attachment is secured, avoiding that breaking up of the continuity of the palatal surface of the plate which must necessarily follow when holes are punched through the ridge.

In soldering aluminum, it is difficult to make the solder flow into and fill up a narrow space such as is formed between the lower edge of a backing and the plate. This may readily be overcome by beveling the lower edge of the backing, leaving the extreme beveled edge of that surface of the backing next the tooth to form the line of contact with the plate. This forms an open V-shaped space or gutter into which the solder (preferably an alloy fusing at a low heat) can readily be applied and a stronger union secured. When soldering clasps of other metal than aluminum to an aluminum plate, a tongue of the same metal as the clasp should first, with solder appropriate to the metal used, be securely united to it. This tongue should be neatly fitted to rest upon the plate. After it is soldered to the clasp and the clasp and tongue properly adjusted, the under surface of the tongue should be "tinned" and coated with some little thickness of solder, the surface of the plate where the tongue is to be soldered being likewise "tinned" or coated with the aluminum alloy selected as a solder. The plate and clasp are now adjusted in proper position upon the plaster cast, and, while they are pressed firmly together, heat is applied by means of a pointed blow-pipe flame until the solder fuses. By this means they can be firmly united. If the operation is skillfully performed, the heat is not sufficient to materially injure the plaster cast. It must be borne in mind that aluminum solders are practically "soft solders"; they have nothing like the strength of silver or gold solders, and in order to make a strong joint there must be considerable surface in contact. It is on this account that I recommend first soldering a tongue to the clasps with hard solder. When aluminum is soldered to itself, we may at times with advantage use a high-grade solder,—that is, a solder containing a larger proportion of aluminum and having a high fusing-point; but where gold, silver, or platinum are to be soldered, we are, on account of the strong affinity which aluminum has for these metals at a high temperature, restricted to a solder having a low fusing-point.

URIC ACID, AND THE DENTAL DISEASES OF THE GOUTY DIATHESIS.

BY L. ASHLEY FAUGHT, D.D.S., PHILADELPHIA, PA.

(Read before the Union Meeting of the Maryland State Dental Association and the Washington City Dental Society, April 25, 1894.)

OF the sixteen estimated ingredients which enter into the average composition of normal human urine, there is one to which, more than to others, appears referable not a few of the ills of life. This is uric acid, $H_2C_5H_2N_4O_3$, a white crystalline powder, almost insoluble in cold water. By oxidation under certain conditions it forms urea, CH_4N_2O. This fact has given rise to a reasonable supposition that the five to eight grains found in the normal urine passed in twenty-four hours is only a portion of that formed in the system, the greater amount having been oxidized to urea, the quantity of which is one hundred and sixty-five to one hundred and sixty-four grains. This proportion of one grain of uric acid to thirty-three grains of urea is accepted by the highest authorities as the healthful normal proportion, and any variation is likely to be quickly indicated by a deviation from health in the subject. I desire at the outset of this study to lay especial stress upon this statement, as it will be the basis of important conclusions.

These deviations from health may be summed up and studied under what is generally known as the gouty diathesis.

This is a monster of protean manifestations which in its intimate nature may include functional derangement of the liver and kidneys, degenerative changes in the fibrous tissues, and humoral and neurotic causes. May I not ask you to rid yourselves at once and forever from the very decided impression which exists in the minds of many persons that the condition indicates some self-indulgence, or is always associated with good living, for I shall show you that these are, at best, only accidents of the diathesis. What it does always indicate is, a diminished amount of uric acid in the urine. Professors Garrod, Haig, and others have shown that, "at the time that the urine is deficient in this principle, it exists in the blood in abnormal quantities." That when the proportion of one to thirty-three is disturbed, it is not due to an over- or under-production of uric acid, but to its non-excretion, to its being stored up in the blood. For this positive statement of so much importance, I am indebted to the long-continued personal experiments of Haig, who showed that when the systems of patients suffering from lithiasis were placed under the influence of seventy grains of salicylate of sodium, daily, for a week or more, this proportion was constantly retained, and was to be accepted as the normal relationship.

This retention of uric acid in the blood is due to imperfect oxidation, to impaired renal activity, or to diminished action of the skin, and constitutes the gouty diathesis. Says Fothergill, "In order to grasp more thoroughly the nature of gout or lithiasis, it is well to remember that when kidneys first appear in the animal kingdom, the form of nitrogenized excretion is uric acid. Uric acid, as urates, belongs to animals with a three-chambered heart and a solid urine,—birds and reptiles. When mammalia are developed, we find a four-chambered heart and a fluid urine, the form of nitrogenized waste being the soluble urea. Certainly minute quantities of uric acid are found in healthy urine, it must be admitted. But when the liver fails in the (practically) complete conversion of nitrogenized matters into the soluble urea, it falls back or reverts to the formation of the earlier form, uric acid."

With this clear comprehension of the gouty diathesis, let us now refer to its expressions in dental diseases. It is not my intention to go into an extended study of these conditions, because of the limited time at my disposal, but more especially because I prefer not to cloud the main object of this paper by so great diffuseness. Much in the last year or two has been written upon them, and to these papers I refer you. These diseases are mainly erosion and pyorrhea alveolaris. I have accepted, and shall ask you to accept, that they are due to the faulty assimilation causing an excess of uric acid in the blood, and offer in support my own writings and those of Peirce, Darby, Perry, Kirk, Leffmann, Brubaker, Thompson, Gibson, and others.

When you have carefully and thoughtfully studied these, you will see why I stated at the beginning of this paper that the condition did not indicate any form of self-indulgence, or was necessarily associated with good living. They occur too frequently in the hard brain-worker, and in those so wrapped up in business that they have hardly time for self or to properly nourish the system. From personal inquiries, I find that our profession, with its strain and tax, its indoor life, its long-protracted hours of work, is peculiarly fitted to, and does, contribute a large quota of suffering patients. I hazard little in the assertion that the large majority of those engaged in the arduous duties of a heavy active practice of dentistry are sufferers to a greater or less degree from perverted assimilation, and that, if the truth were known, the friction which they endure, and its high-tension nervous expression, is due to the retention of uric acid in the system.

I have been a close student of this for some time, and I know of what I speak. We cannot live as we do, and eat the diet that we do, and escape. The tell-tale evidence is on your finger-nails. The more covered they are with little white specks, the more are you a victim of such pernicious habits, and your urine will corroborate the fact. *Uric acid is not the cause but the sign of a condition.* With you as with patients of the gouty diathesis and with its dental diseases, perverted assimilation is the trouble, and our whole efforts in treatment must be bent toward its correction. This is the total grasp of the subject—this is truth in a nutshell. The local treatment of gout, of the gouty diathesis, of erosion, of pyorrhea alveolaris, of high tension and overwrought nervous systems, is valueless, except we and our patients make every effort to correct perverted assimilation of food.

The aspect of the case calls for three lines of treatment: (1) To get rid of the urates so as to render them soluble; (2) to improve and raise the functional capacity of the liver; (3) dietary considerations.

For the uric-acid solvent, lithia carbonate in five-grain doses can be given *ter die*, or sodium salicylate in fifteen-grain doses, four times a day; or for the latter may be substituted ammonia salicylate in five-grain doses, every two hours under acute symptoms, until relief is felt, and then continued *ter die*. The salicylates are supposed to seize the uric acid and form a soluble salicylurate. The ammonium preparation is often to be preferred over the sodium, as it is more soluble in the stomach; and, moreover, besides giving to the system the tonic effect of the ammonia, it averts the introduction of the sodium as a base for insoluble compounds with existing phosphates in the urine. The liver is best acted upon by hepatic tonics and hepatic stimulants, such as strychnin, ipecacuanha, taraxacum, and euonymin.

By their action the tendency to form uric acid is lessened, and the capacity to form urea is improved.

Regarding diet, let me impress upon you that the important consideration is to control the quantity rather than the quality,—diminish the quantity of food taken. Patients of the gouty diathesis and members of the dental profession should always leave the table hungry. Touching the quality, meat but once a day, preferably lamb; substitute largely fish in its various forms. Avoid particularly fatty articles. While both albuminous articles and the carbohydrates are injurious, the latter group is the more so. No beer or malt liquors are to be allowed. No alcohol, because it lessens the elimination of waste products. Of vegetables, those containing oxalic acid are to be especially avoided, such as tomatoes, asparagus, and rhubarb. Onions, celery, turnips, and carrots can be partaken of in moderation. Spinach, though apparently contraindicated, is allowed, because of its purgative action, but vinegar upon it should be omitted. All decidedly acid fruits are to be shunned. Of the fluids, milk, water, tea, and coffee are permissible. The latter has a happy influence on account of its diuretic action and its resultant control of obesity.

In conclusion, let me say it is not to be forgotten that with other remedial agents the keynote of the situation is moderate out-door exercise, and plenty of sunshine and fresh air. Without these, all of the best-directed efforts to correct faulty assimilation of food will be without avail.

AMBIDEXTROUSNESS.

BY HENRY B. NOBLE, D.D.S., WASHINGTON, D. C.

(Read before the Union Meeting of the Maryland State Dental Association and the Washington City Dental Society, April 24, 1894.)

AMBIDEXTER means one who can use both hands with equal skill. It is of Latin derivation : *ambo* (both), *dexter* (right).

The hand is one of the most marked characteristics of man ; it is an index of character and intelligence in both man and woman, and the capacity to use it shows man's intellectual development.

It is generally supposed that most persons are born with a superior skill, or dexterity, with the right hand ; yet to all appearance there is no difference at birth.

Anatomists inform us that the left hemisphere of the brain is usually the largest, and the convolutions of the gray matter, which is the source of nervous energy, are more numerous than on the right. The nerves that govern and produce muscular action on one side of the body have their origin in the opposite hemisphere of the brain.

The arrangements of the blood-vessels give a greater or more direct supply to the left hemisphere of the brain. This is due to the larger caliber of the left carotid artery, and the theory has been advanced that left-handed people were produced by a change in the large carotid from left to right, as has been occasionally seen by anatomists. So far as known, only one brain of a known left-handed man has been examined with this end in view, and the right hemisphere of the brain was reported as the largest. This examination was by Sir Donald Wilson, of the University of Toronto.

Be this theory right or wrong, no observant person can doubt that persistent use and education can and will overcome any natural tendency or bias.

Some of the most skillful and renowned people in history have been left-handed men. In the Bible, Judges iii, 15 : "But when the children of Israel cried unto the Lord, the Lord raised them up a deliverer, Ehud the son of Gera, a Benjamite, a man left-handed." This same Ehud killed Eglon, king of Moab, with a dagger in his left hand.

Again, in Judges, twentieth chapter : "Among all this people there were seven hundred chosen men left-handed ; every one could sling stones at a hair-breadth, and not miss."

We also have an account of a company of men under King Saul that were "mighty men of war, and could use both the right hand and the left in shooting arrows out of a bow."

Thus we have noted examples of what education and training will do for the left hand.

Skill in our profession is largely due to the dextrous use of our hands, guided by an educated, trained brain and sound, intelligent judgment. Our fingers must be educated to delicacy of touch, guiding and directing our instruments into pockets and corners out of reach of the eye. Nearly all this tiresome and exacting work is done by the right hand, the left being but a poor assistant.

Is it not possible to educate our left hand so it shall be a more efficient help in our daily manipulations?

We often see, where one of the senses or an arm or a finger has been lost, other senses or members take their place and seem to perform their work with equal efficiency, and in some cases far exceeding the natural use of the lost or incapacitated member. Does this not indicate that the left hand, by education and training, can equal in skill the right?

It is a conceded fact that use gives health and strength to all parts of the body. Our teeth are better when in daily use; why then should we neglect our left hand, and allow the right to do the work that should be equally distributed between the right and left?

Why should we neglect one side or part of our body, and thus deform the perfect model given us at birth? It is a duty we owe ourselves, that we make the most of what nature has given us.

Young children show slight, if any, preference in the use of their hands, and as often extend the left as the right; but the poor little innocents are taught to give preference to the right, and the poor little left hand punished if it attempts to assist its right.

Most children would become ambidextrous with proper care and encouragement. I believe it the duty of parents and teachers to encourage the habitual use of both hands, and the present habit and fashion of cultivating the use of the right to the neglect and non-use of the left is an evil and a detriment to all, and especially to those who labor with their hands.

I would ask the young men of the profession to give this subject their attention, believing, as I do, that to become an ambidexter will greatly aid and assist them in a large number of operations, and give rest and relief to that overworked right hand.

Let every student and young man practice with the left hand the use of the file in the laboratory, and in all work upon plates. Systematic training of the hands is not antagonistic to mental growth, but greatly assists it.

The natural capacity of the hands is the necessary companion of man's intellectual development. Let the brain and the hand work in unison.

We all know what education will do in the use of the mouth-mirror, by educating the hand to a reverse motion, so we can excavate cavities or feed and condense gold where the places can only be seen by reflection. This is an example of what training and education will do.

What a help it would be to all of us if we could use our left hand equally with our right! Is it not worthy of our attention to cultivate and educate our neglected left hands and become ambidexters?

I think this possible if begun in early life. I think parents and teachers, and especially teachers in our dental colleges, should be asked to give this subject their attention.

A SYSTEM OF DECAYED-ROOT REINFORCEMENT FOR CROWN- AND BRIDGE-WORK.

BY I. G. BAUMGARDNER, SAO PAULO, BRAZIL.

WHO of us has not been puzzled at the obstacles offered in crowning roots whose exposed surfaces have decayed, or been otherwise lost far beneath the gingival margin? The sound portion may be strongly anchored in the alveolus, and be otherwise serviceable for a good crown, but the difficulty encountered in building it out for use always makes us uncertain as to its durability and resistance against the force to be used upon it.

In the hope that some one may be benefited by the following description, the writer offers a system which he thinks is original, and which he has used with success in his practice:

Let us suppose a superior central incisor in the condition described—with the root-margins decayed completely or partially far below the gingivæ (Fig. 1). The root is first treated antiseptically, the canal enlarged, and the apical foramen sealed. The gum is carefully pressed back with gutta-percha, exposing the ragged margins, which are trimmed and beveled slightly outward, after which the gingival third of the canal is further enlarged, as shown in Fig. 2.

FIG. 1.

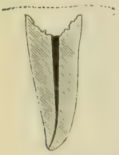


FIG. 2.

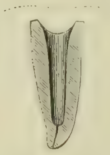


FIG. 3.

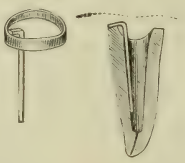
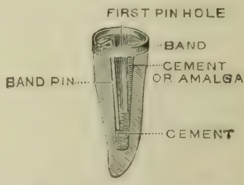


FIG. 4.



A flat and narrow pin is now adapted to the side of the enlarged canal, and its free end bent outward at a right angle over the end of the root as far as the periphery. The periphery of the root is next measured with a piece of binding-wire, and a band of the same size is made of thin platinum or gold which just clears the extreme bevel on the root. The band should be of such width as to extend from the surface of the root to the gingival margin, or the length of the root desired for the crown. To this band the pin is soldered and afterward securely cemented in the root-canal, care being taken to press the pin to the side of the root (Fig. 3).

A pin in size to that of the future crown is now selected, and, after carefully reaming out the cement in the opposite side of the root, leaving it extend in the apical portion about a quarter of an inch to secure the band-pin, the pin is placed in position, and amalgam or cement is packed around it, completely filling the space in the root and in the band flush with the gingival margin, care being taken to rotate the pin from time to time to admit of its easy withdrawal.

In manipulating the amalgam or cement, a little is placed in the pin-hole, and upon inserting the pin the excess is driven out, which gives additional attachment for that which fills the band, thus making a perfect union between band and root (Fig. 4).

In case a fixed post is desired, this is easily attached to the band (not requiring the side pin), and cemented to place, filling the band as desired with cement or amalgam. Should it be found difficult in any case to bring the band perfectly in contact all around with the root-edge or margins, the space is easily filled up with amalgam while filling the band, and trimmed before hardening.

Roots so reinforced have practically the strength of perfect roots, and are adaptable for any system of crown or cap. The enlargement of the root-canal can generally be made in one side,—which takes little from its substance,—and the two pins insure the security of the crown.

Decayed molars and bicuspid roots I reinforce in the same way, and the system is very useful in making a quick all-metal crown,—particularly where the bite is abnormal, or so short as to make the articulation of a cap-crown difficult. The band of gold or platinum is carefully filled and made high enough so as to just come in contact with the occluding teeth, after which it is soldered to one or two pins,—as there are roots,—and securely cemented to place. Amalgam is packed around the pins and in the band, and before hardening is dressed and articulated with the antagonizing teeth, making as perfect a masticating surface and as secure a crown as could be desired.

PROCEEDINGS OF DENTAL SOCIETIES.

TENNESSEE DENTAL ASSOCIATION.

(Concluded from page 396.)

WEDNESDAY MORNING, March 28.

AFTER routine business, Dr. W. C. Kulp, Davenport, Iowa, read a paper on "Nomenclature of the Surfaces of the Teeth and the Location of Cavities," of which the following is an abstract:

He proposed presenting a nomenclature different from those of others, because it was much better and easier. He presented the subject because he wished criticisms and opinions as to the usefulness of his system, and to explain objections. . . . Anatomists have drawn an imaginary line through the middle of the body which is called the median line, and describe the sides and parts of the body with reference to this line. The terms mesial and distal have been used in reference to the approximal sides of the teeth, as to whether they were turned toward or away from the median line. But these are incorrect as applied to the back teeth, for the lingual face is then the mesial, and the buccal the distal. He prefers the central and lateral instead, with combinations with the names of adjoining teeth. So anterior and posterior are misleading terms as applied to the same parts of the teeth both front and back in the mouth. Nomenclature is the sign-board of the intelligence of the profession. The terms used in nomenclature should be self-explanatory. There should be a weeding out of ambiguous and incongruous terms.

Why should we go to the classical languages for words? We can use the vernacular for our purposes, as English is fast becoming the universal language, especially of our profession. His system was based on anatomical outlines described with English words. We are familiar with the ordinary terms, and these are the basis of his nomenclature. He divides the crown into thirds, both perpendicularly and transversely. The crossing of the lines makes spaces by the subdivision of the crown into areas, which are numbered in order to locate cavities. The numbers are from one to ten, and if cavities extend beyond the area numbered there is a combination of numbers formed. Degrees of decay are described after the French system,—*i.e.*, first, superficial; second, deeper; third, still deeper; fourth, approaching the pulp; fifth, exposure of the pulp. His system is simple and complete, and is capable of indefinite extension.

Dr. Patrick had heard many papers on this subject, and thinks there is no portion of the body that is so difficult to plan and map out for description. He prefers to confine his nomenclature to the terms in general use, but these too often require explanation. This paper is superior to all others in that it proposes to describe all parts of the teeth in a system useful to the operative dentist. Some systems describe the surfaces, but not the margins. These are not described in any other system. A cube has six surfaces, which have borders forming twelve margins. The lower molar has five surfaces and nine margins, counting the cervical edge of the enamel as one margin. Every part of the surfaces of all the teeth is divided into areas by Kulp's system, and numbered in regular order and system. Ordinary systems set aside the cuspids for separate consideration. They are made on the principle of a cone, and present a conic section in any position in which they may be cut. They are troublesome to the anatomist, as they have no well-defined margins. The general anatomist divides the part into internal and external The surface that is toward the center is internal; the surface that is away from the center is external. Then the terms superior and inferior are used, the first to designate the upper surface or part, the second to indicate the lower surface or part, so we say the superior and inferior jaws and teeth. To alter these terms, or to propose anything new to the profession, is not only inadmissible, but impossible, for to alter anything in the dental mind is like writing on a greasy slate. So the terms adopted by the operative dentist must be followed. Dr. Kulp's system is complete for the purpose of enlarging the ordinary system, and it is capable of indefinite extension. Like the harp of a thousand strings, the more you play on it the more music you get out of it. My friend has come nearer the complete system than anything I ever knew, but I would sooner perform an operation than describe it in technical terms. A man to study this matter must take a course in crystallography to determine the philosophy of surface-angles and body. The terms we use are useful for the operative dentist, but would be confusing to the anatomist.

Dr. Marshall. All previous divisions of the teeth have been anatomical divisions based upon anatomical nomenclature. Dr. Kulp now tries to give us a surgical division of the surfaces of the teeth, based on their anatomical forms. He thought *angles* would be a better term to use than *margins* for the edges of surfaces except the cervical borders. If the writer would accept that, it seemed to him that the system would be perfect.

Dr. W. H. Morgan. He was not a philologist or grammarian, but he understood that language was intended to convey ideas.

Some years ago the word "approximal" was much discussed, but the word is now in the dictionaries and in general use, and we all know what it means. He objected to the use of the word "occluding," as applied to the edges of the incisors. These edges do not occlude, but pass each other, except when much worn down.

The ordinary terms are good enough for ordinary purposes, and are generally understood. Still, we may all honor the man who is both able and willing to devote labor and thought to a paper like that.

Dr. A. O. Hunt. Teachers have experienced many difficulties in describing teeth by the various systems we have had. It is always difficult without using too many words. The words *anterior* and *posterior*, mesial and distal, are none of them entirely correct. They do not describe the parts of the teeth as well as the terms used by the essayist. These terms describe every part of the tooth perfectly, and it is not difficult to become familiar with his system. The practical use of it with students and others will demonstrate how easy it is to understand. A system must be followed out without change. A term used to describe a particular part of a tooth should be applicable to the same part in all teeth.

Dr. Morgan. A careful study of the paper will indicate that it does not have such a multiplicity of terms as there seems to be on first acquaintance with the system. The terms mesial and distal are applicable, really, to the six anterior teeth only, and the words anterior and posterior are applicable to the bicuspids and molars only, for the description of the approximal surfaces. These terms would necessitate but one change, and that at the turn of the arch, at the cuspid.

Dr. A. H. Thompson. The subject had always been of great interest to the speaker, as we are so much in need of uniformity. As all systems are more or less arbitrary, it does not matter which system is adopted, just so that it is *something* that could be made universal and put a stop to the confusion that now exists.

There will always be some conflict between the anatomist and the operative dentist,—the terms of one will be more or less confusing to the other. The proper thing to do would be for the operator to adopt a system founded on zoological and anatomical nomenclature, and on that basis map out the tooth-surfaces into spaces with numbers, as in this scheme of Dr. Kulp's. His system is certainly perfection in that particular line, but it seemed to the speaker that the anatomical nomenclature at the basis of it might be improved.

Dr. Noel thought the system excellent, but that it should be contracted and simplified so as to make it more practical. Perhaps it will be improved in that direction.

Dr. Freeman did not see how he could note the system in his books. Every man has a system of notation of his own, which is clear and perfect in his own mind, but to express it to others requires a common language. Our ordinary nomenclature we all understand and must use. We must begin at a point on which we all agree. He hoped that Dr. Kulp would reduce his scheme to a uniform reference system.

Dr. Crawford said that while not able to agree with the essayist, it was important that we should have some system of describing the surfaces of the teeth. He hoped that he would extend his work to include the varieties of occlusion of the teeth, which has so much influence on our operations. Malocclusion is the most important factor affecting their durability. He liked the idea of describing the surfaces of the teeth in sections and areas.

Dr. Kulp, in closing, said that we must have a system that is continuous from the median line clear around. His terms were applicable all around. Even his students have a clear understanding of it, it is so simple. The surgical division of the teeth into parts is very important, in order that each portion may be shown clearly and perfectly.

The only way to make progress in any line is to take it up and make a special and exclusive study of it. If we subdivide our work, we can accomplish something in one special direction by exclusive devotion to it. He had followed this particular subject for twelve years, and thought his system as perfect as any could be made.

In regard to the use of *angle*, it would be confusing to the student, as he employs that word in speaking of cavities, and reserves *margins* for describing the crowns of the teeth.

Studying the cuspid led him to making a new nomenclature, as in all other systems this tooth was very uncertain in its relations. He found that he could describe the surfaces of this troublesome tooth very satisfactorily by his system.

The term *occluding* for the anterior teeth had caused him much trouble. This term for describing the articulating surfaces of the teeth was selected from a number of others taken under consideration by a committee appointed by the American Dental Association in 1885. By their suggestion he adopted the term, and it has since come into general use.

Afternoon Session.

Dr. Patrick presented his instrument called the "natho-dynamometer," for testing the strength of the human jaw, and said that we have often heard of the enormous strength of the human jaw. A paper presented somewhere some years ago put the estimated strength at six hundred to eight hundred pounds. He had stated then that he did not believe it could be over one hundred and fifty pounds. After that statement he felt called upon to prove it, and invented this machine to make tests. He made levers, the end of one being a pointer to move on a vernier to record the amount of force. He found that the greatest power was exerted in the region of the first molars, and that the farther we got from that point the less the power became, so that the anterior teeth were more wedge-shaped in order to be more effective with less power. This is in harmony with the law that mechanical force and jaw-movement dictated the forms of the teeth.

He experimented in cracking nuts. He found that some required more force than others to break, and that every nut required more force in one direction than in another. He found that the black walnut cracked sideways with two hundred and fifty pounds, and at the seam it required five hundred pounds. So it was with other nuts. He experimented with different kinds of nuts on animals, and found that they would turn the nut in the mouth to find the weakest point. He had seen the hog do this. He found few men who could crush a hickory-nut.

He had tested many, and found that the greatest crushing power of the human jaw was not over one hundred and thirty pounds ; but this power is reinforced by the cusps on the molars, which act as wedges and thereby increase the crushing-force. His instrument measured the jaw-power, and he had had the scale tested by the Fairbanks Company in order to prove the measuring-power and make the scale exact.

Dr. J. P. McDonald then read a paper on "Frauds," of which the following is an abstract :

Fraud is a term that can be applied to persons or things which deceive and injure others. In the region of morals there are many wrongs which the courts cannot and do not try to redress ; but there is one right which they do protect that is deeply implanted as our constitutional prerogative, and that is the protection of the person. Every essential of the welfare of the body must be protected. A man who assumes to treat the teeth and is not capable, is culpable before the law. He has not prepared himself, and assumes to do what he cannot perform. We attend meetings to obtain benefit, but if we do not do so we forfeit our opportunities. The use of nostrums for the painless extraction of teeth, of which the composition is not known, is one of the greatest frauds in the profession to-day. It also leads to the wholesale destruction of teeth, which is itself a crime.

Dr. Stubblefield. A man never rises higher than his ideals. If a man does not consider that dentistry is worthy of his highest efforts, then he ought not to be a dentist. Many dentists are good in their professional work, but are unworthy morally. They stoop to ignoble and dishonest practices. From the very nature of their work they should be of the highest type of character in every respect.

Dr. W. H. Richards, Knoxville. He does not extract teeth at all. He sends his extractions to "the other dentist." Many people cannot afford constant operating to keep the teeth up to efficient standards, and wholesale extraction is with such people sometimes excusable. In the matter of destruction of the teeth by the quack, the victim sometimes learns more by one experience with them than he will by our preaching for years. One experience with a "painless" nostrum-user will usually have the effect of making him give attention to the preservation of the teeth that remain.

Dr. W. H. Morgan finds it necessary to extract teeth, and has for years. He always relieves pain when possible. Somebody has to extract teeth, but it must be done conscientiously, because in some cases it would be morally wrong.

Dr. Crawford. Extracting is an operation that will be necessary for all time. The matter of the unrestricted extraction of teeth, with which our laws do not interfere, is giving the state boards a great deal of trouble. Our board has been frequently asked if it is a violation of the law for unlicensed men to use the cocain-nostrum anesthetics. In other words, can a man travel over the country and extract teeth recklessly and unmolested under the clause in our law which reads, "Provided nothing in this law shall prevent any one from extracting teeth," and use a nostrum anesthetic hypodermically? After extensive discussion of the matter the Tennessee board had decided that the insertion of a hypodermic needle was a grave surgical operation, and in unskillful hands was very dangerous ; that it was a separate operation from the extraction of teeth, and that its use by unlicensed men should be prohibited.

Dr. Freeman had some clear convictions regarding our duties to our patients. He thought Dr. Richards shirked his duty when he refused to extract teeth for his own patients and sent them elsewhere. There is a sympathetic relation that must be established between the dentist and his patient. A man is not honest who will not try to convince his patients as to what is best for them, and he must be able to give them the very best that can be done for them by the profession. The man who will not extract teeth when it is necessary—and it is sometimes the best and only thing to be done—shirks a responsibility. It is your first duty to save what teeth you can ; but if you cannot save a tooth, even with the advice of others, and it becomes necessary to extract, do not send them away because it is a disagreeable operation, but face your duty and perform it.

Another matter is that he always feels a disgust when he puts in an amalgam filling. It is a disgusting and slovenly operation, and one we should never do when we can possibly avoid it.

We should give time to educating people in regard to the possibilities of our profession. We should not fail of our duty because an operation does not pay. We should place the whole matter fairly before the patient, and if he refuses to have the best thing done we will have discharged our responsibility at least.

Dr. Richards had just as much appreciation of the teeth as any man. He prefers to send his patients to those who are expert in extracting. We must save the teeth whenever possible, but extraction is, of course, sometimes necessary.

A paper was then read by Dr. Frank H. Smith, of Water Valley, Miss., upon "Dead Teeth," of which the following is an abstract :

If we had but one class of diseased teeth to treat, the operation would be greatly simplified, but there are many varieties of disease which afflict these useful members. A large part of modern dental practice consists of the mere treatment of disease. He wished to submit a method of treatment of pulp-canals, which, in the thirty-eight cases he had used it, had been uniformly successful. His method was the vaporized iodoform apparatus introduced by Dr. J. G. Blair, of Louisville, Ky. The method is simple and effective, and the vapor reaches to the farthest extremity of the canals. His procedure is to open and cleanse the pulp-canals, then saturate with carbolic acid, and leave for twenty-four hours. He then opens and uses the iodoform vapor every twenty-four hours until the inflammation is gone. He then heats the canal with hot air, and fills with gutta-percha points, the hot tooth facilitating the passage of the points.

He had also used the vapor in the treatment of antral diseases, one application seeming to effect a cure, but he had not had enough experience to be able to say positively as to its effectiveness. The moisture in the antrum seemed to prevent the best action of the vapor. The method will probably be found useful in other diseased conditions also.

Dr. R. D. Crutcher, Lewisburg, Tenn. The proper method of treating dead teeth is to open and cleanse the canals and saturate with alcohol thoroughly. Then thrust a hot instrument in to vaporize the alcohol and dry out the tubuli. We are much in need of a uniform method of treating and filling dead teeth. He believed that carbolic acid had been almost discarded.

Dr. John G. Blair, of Louisville, said that about six years ago he accidentally discovered the method of vaporizing iodoform for treating dead teeth. He had used it exclusively since that time. In a record of eight hundred cases he had not lost a single tooth, so far as he could tell. The means by which this antiseptic can be applied are inefficient, but it is a powerful germicide, and by vaporizing it penetrates every part. It makes a deposit which fills the apical space and closes it perfectly. This deposit will last for twenty years without change. In some cases of antral disease he had not succeeded because it could not be got dry.

Dr. Crawford. In the treatment of pulpless teeth he believes that this important question should have more light thrown upon it. Absorption of pus is often accomplished. Take a typical case,—a blind abscess at the end of the root ; he thinks it is possible for the contents of that sac to be absorbed by nature. If all the tissues can be affected, he does not know but that the sac can be absorbed, and if the dental can be so aborted so can others. Keep the canal open to effect drainage.

Dr. W. H. Morgan. All curative treatment is founded on the idea of the removal of the cause of the disease. The cause of abscess is putrefaction in the pulp-canal, the pus passing out the apical foramen ; in cases of long standing they have lost their power of action. A collection of pus is often absorbed. Nature has only three ways of disposing of foreign substances : it will encyst hard substances in the flesh, or it will form pus about it to suppurate to throw it out ; the other way is by absorption, and absorption always presupposes liquefaction. Pus is a benign fluid. In many dead teeth there is so much suppuration as to cause the destruction of the bony structure, the cementum.

He wants to enter his protest against passing instruments through the foramen ; if it is open, it must be closed up without going through the apex. He treats abscess with iodin and carbolic acid, and has for years. Miller demonstrated that iodoform was practically useless. He thought that the vaporizing process spoken of merely liberated the iodin, and just as good results could be obtained by the use of iodin itself.

Dr. Freeman. Iodoform sticks in the minds of the profession. There are some who use carbolic acid, but for himself he likes the good old "ham fat" creasote. He cleanses canals, saturates with creasote, heats a flexible silver needle, runs it up in the canal, heats and vaporizes the creasote, and thus favors its penetration into the tubuli. We cannot often get into the crooked roots, but the creasote vapor will go into the canals ; then he fills with wax, which will follow down while the canal is hot, and then pushes in the lead points. He thinks that is perfection as a root-filling.

Dr. Beach does not think that carbolic acid should go into a tooth every day. A large percentage of the failures in treating dead teeth lies in the fact that they are not allowed to heal naturally, but are treated too much. Especially is carbolic acid used too much. It breaks the tissues down. If the root-canal is thoroughly cleansed of septic matter, you do not need to treat it any more. If the root is denuded, it should be cut off, of course.

Dr. McDonald. He was taught in school to use iodin, eucalyptol, and creasote, a combination which he still employed.

Dr. Lees. It used to be the custom to pump medicine into the apical space. The prominent feature in the treatment of all pulpless teeth is purification. The main thing is to purify the canal, avoiding everything that will tend to force anything through the apex. That is the dangerous point. If that is closed, you will not have an abscess. Extreme medication is no longer in vogue, but we now use something that is benign and simple.

Dr. Smith, in closing, said that he thought the iodin was liberated from the vapor in the canals, and that it was better applied in that way than in liquid form. He had not used iodoform simple. He used carbolic acid only at the first sitting.

Thursday Morning, March 29.

After some miscellaneous business, Dr. R. D. Crutcher, of Lewisburg, read a paper on "Enamel Margins," of which the following is an abstract:

Cavities should be well finished at the edges to avoid fracture of the enamel. Labial cavities are very difficult, especially when extending under the gum-margin. The gum will sometimes need to be split to give access to the deep margin. Labial cavities are more difficult on the inferior than on the superior teeth. On the grinding-face, when caries occurs in separate pits and fissures they should be run together, removing all soft enamel, leaving no overhanging edges to break off subsequently. In approximal cavities, the undermined margins should be cut away and the edges of the cavity well polished. In the bicuspids and molars, the cervical border of approximal cavities should be made U-shaped and not flat, except of course in cases where the decay extends outward on either side.

Dr. A. A. McClanahan. He extends cavities always to include soft enamel, cuts out all fissures, etc., to prevent recurrence of caries. He has seen many little fillings in different parts of the crowns of molars, but thinks that that method is a mistake, as they should be cut together and run into one filling. He has had trouble in filling the cutting-edges of the anterior teeth. The sharp angle should be cut out to the edge in approximal cavities when undermined. He applies the rule again,—extension for prevention.

Dr. Gordon White, of Nashville, submitted a report on "Orthodontia, with Report of Cases." He had a case of a young man twenty-one years of age, whose jaws were propped apart by the third molars, which touched only at the posterior edges, and the anterior teeth were three-eighths of an inch apart. He could not chew his food, and something had to be done. The lower anterior teeth protruded somewhat, the right cuspid and lateral standing out considerably. He extracted the second lower bicuspids. He then made a band-plate, with hoods covering the lower molars articulating with the upper teeth, for him to eat on. He also made projections on the buccal side, in which screws were inserted, and with a little strip of German silver the protruding teeth were drawn backward. He then removed the upper third molars, and ground down the second molars, and got a very fair articulation. The first molars do not yet strike, but will rise in their sockets. If they do not come together, they could be raised by crowning. He did not use a head-cap, but depended exclusively on manipulation of the teeth. The head-cap can sometimes be used in similar cases with benefit.

Dr. Lees. It takes a large amount of nerve and dogged persistence to make a success of regulating. One of the first requirements is to have absolute control of the patient and be without outside interference. Our branch is being divided into specialties, and orthodontia is rapidly becoming a specialty in itself. This will be necessary, and men must be set apart for it in every community, in order to make an entire success of it. The ordinary practitioner has not the training and cannot give the time to regulating, so we will be forced into making it a specialty. He had found even simple cases very discouraging, to say nothing of the complicated ones.

Dr. A. H. Thompson had not found regulating such a discouraging matter,—when it is gone at in a systematic manner. He would rather undertake a case of regulating than some difficult and exhausting filling or crown operations.

He wished to submit a simple device for the speedy correction of that form of irregularity which consists of ingrowing upper laterals, which are caught within the inferior teeth in occlusion. Such cases are sometimes very difficult to correct, even with a plate, as they involve more or less spreading of the arch. He had used an apparatus consisting of a cap over the tooth to be brought out, to which a T-shaped piece was soldered, extending outward with the arms resting on the adjoining teeth. The cap is cemented on the tooth to be moved, and wedges are inserted under the arms on the anterior faces of the approximal teeth ; these wedges are renewed as often as necessary, being careful, as in all regulating operations, to not move the teeth too rapidly. As the tooth is drawn out, the piece is removed, the stem shortened, and replaced. This wedging will cause the teeth to move, and space will be gained by spread of the arch. A retaining-piece must afterward be worn for some time, of course.

He had found the Coffin spring plate of great utility, not only for spreading the arch, but also for moving individual teeth that had erupted in wrong positions within the arch.

Dr. White said he had found that for wedging compressed cottonwood was the best thing he had used. He had had gratifying results with the Coffin plate,—there is nothing that takes its place.

From experience he would say it is perfect folly to commence a case of regulating without having absolute control of the patient and be free from interference by the family or any one else. He never begins a case without the consent of everybody concerned.

Dr. J. A. Dale, of Nashville, read a paper on "Dental Technics," of which the following is an abstract: "The dental department of Vanderbilt University now uses the method of dental technics introduced by Dr. Cattell, of Chicago. Teeth are dissected by being cut in different directions and at various depths. A tooth is fastened to a block of wood, the block is screwed in a vise, and the tooth is cut partly away. The block is taken out, the cut surface of the tooth is inked from a pad and an impression made on paper. An assortment of these impressions shows the arrangement of the enamel, dentine, pulp-canals, and other structural characteristics. The students are required to print the teeth in series, with sections of all the teeth and proper classification. This gives the student a knowledge of the structural divisions, and illustrates therapeutic procedure. The student is required to fill the root-canals of teeth set in plaster, which are then dissected to see how the operation has succeeded."

Dr. J. T. Gray, Nashville. All students should be interested in dental technics, but this instruction is carried out farther in some colleges than in others. He would go a step farther than the doctor does in filling teeth out of the mouth,—then carry them on to the living subject. The colleges are constantly carrying instruction farther and doing things that have never been done before. The schools are for experimentation and instruction in the use of all kinds of tools and materials.

Dr. A. O. Hunt, Iowa City, Iowa. The technical system described is very excellent, and its practical value is fully appreciated in colleges where the method is in use. Dry teeth should be saturated with water to which twenty per cent. of glycerin has been added. Then drop the tooth into beeswax and turpentine. The water and glycerin expand the pulp ; the beeswax and turpentine fill up interspaces and make the structure of the tooth more apparent.

Dr. Kulp thought that the college course should be four years, and that one year should be spent in a mechanical engineering department. We can acquire expert skill by working on metals as well as on the teeth. Those who are good mechanics are better prepared for our work than those who are not. He knew of one practitioner who spent some time in a sewing-machine factory, where he acquired considerable mechanical skill. He now finds the value of that training after a number of years in dental practice, and is thankful for it.

Dr. Lees. The teaching of dentistry is very different from what it was ten or twelve years ago. There was nothing of this sort of technical teaching then. This is a kindergarten idea,—instruction in the use of materials. It is wonderful what children will do in a kindergarten school. We impress students more forcibly by these technical experiments and exercises. Dentistry is a practical thing, and the student must be instructed by manipulation with the fingers. We must have didactic teaching, but we must also have practical instruction.

Dr. Patrick admires this system of making sections of teeth, a profile, to illustrate the inner surfaces of the teeth. As far as it goes, it is all very well. But he would go a little further and make sections of the tooth with its surroundings, which would give not only the internal surfaces of the tooth, but a section of the tooth-cell in which the tooth is implanted,—the alveolus with its cellular structure, and the jawbone with its bone-cells, etc. By such a section you get all the parts ; it is a perfect picture, and impresses the students. They will never make blunders in treating abscesses after studying that.

Afternoon Session.

The following officers were elected for the ensuing year : W. H. Richards, Knoxville, Tenn., president ; J. M. Glenn, Trenton, first vice-president ; W. W. Jones, Murfreesboro, second vice-president ; R. D. Houston, Lewisburg, recording secretary ; W. J. Morrison, Nashville, corresponding secretary ; B. D. Brabson, Knoxville, A. R. Malenda, Knoxville, G. S. Pearcy, Jackson, executive committee.

Next place of meeting: Knoxville, Tenn., on the first Tuesday in July, 1895.

The social events of the week were very enjoyable, and the lavish hospitality for which the South is so noted was extended to the members of the association and the visitors. On Monday evening a musicale and reception was given in the Young Men's Christian Association Hall. On Tuesday evening a stereopticon exhibition was given in the lecture-room of Vanderbilt Dental College, and on Wednesday a sumptuous banquet was given in the Nicholson Hotel.

UNION MEETING OF THE MARYLAND STATE DENTAL ASSOCIATION AND THE WASHINGTON CITY DENTAL SOCIETY.

THE union meeting of the above-named societies was held in the law school of the National University, Washington, D. C., Tuesday and Wednesday, April 24 and 25, 1894.

FIRST DAY—*Morning Session.*

The convention was called to order at 10.30, Dr. H. M. Schooley, chairman of the joint committee, in the chair. In his opening address he spoke of the benefits to be reaped from such gatherings in their influence upon the advancement of knowledge and the cementing together of the dental profession in bonds of closer fellowship. He also gave a brief sketch of the establishment and growth of dental societies.

In closing, he bade all welcome, and introduced Dr. W. E. Dieffenderfer, president of the Washington City Dental Society, who made a short address, which was responded to by Dr. B. Holly Smith, president of the Maryland State Dental Association, as follows :

Having referred to the previous joint meeting of the two societies, held nearly twenty years ago, and the significance for oneness of purpose, of effort, and of professional regard which it implied, he voiced the appreciation of his own society of the hospitable welcome which had been given to them, reciprocated their professions of regard and esteem, and congratulated them upon the efficiency of their organization. Speaking of the pride which they felt in the development of the city of Baltimore as an educational center, he said,—

The very keystone of the contest we are called upon each year most emphatically to urge is the correct education and training for all seeking to join our ranks. This is so obvious a truism that I, perhaps, should apologize for uttering it, but I shall proceed to state another truism which seems to me equally obvious, and that is this : However much colleges may do for a man in giving him the correct start, in enabling him to take direct courses, and with least possible waste and friction, yet, after all, the busy practitioner's education is progressive and continuous ; it is co-extensive with his professional life, only determined by his professional experience.

How many of us are conscious that the knottiest professional problems have to be met frequently by trained and skilled men, yet without adequate preparation to deal with them ; how many have felt the pride of overcoming these difficulties or the humiliation of defeat. And yet, in the light of a long and varied experience, if even a large part of the difficulties which practice has everywhere encountered could be prepared against, what a difference it would make to us all. How much richer the entire profession if it were possible to give to each the sum of the knowledge acquired by all.

If your professional experience compare in extent and variety with mine, and you can impart to me your happy solutions of difficulties, and I can warn you concerning my failures, neither of us is the poorer, but each is twice as rich as before. Extend the notion, project the idea, and it is evident that if adequate machinery can be secured to give to each the sum of the experiences of all, the millennium of dentistry is a day not far removed.

Nor does this beneficent effect apply alone to those things which have been done. It applies yet more forcibly and comprehensively to "things yet to come."

Any one of us in the happy vein of optimism can drop into prophecy and call up visions of our profession's great and glorious future. The millennium is a favorite subject of reflection, and a favorite topic of conversation even with those whose long careers of usefulness must deny them the hope of witnessing it. It has to do with a richer knowledge, a deeper research, a more splendid skill, a more complete relief from suffering, a fuller recognition of merit.

Its realization demands a profounder study, a more patient investigation, a more determined endurance, a more potent energy. It calls upon us to separate more clearly the potential elements that compose the basis and ground-work of our professional knowledge and skill, and to combine them anew into more beneficial and more powerful resultants. It requires subtler analysis and more masterly synthesis.

It invokes the best efforts of us all ; it places before each of us a noble ideal ; and shall we not use all honest means to attain that ideal?

Now, what means are suggested? It doubtless goes beyond my function to enter at this time into a complete discussion of all the means,—they are certainly summarized in the minds of every reflective person present,—but I will say, gentlemen, that whatever be the especial form the means take, their result must be a keener stimulus to effort, and a more encouraging recognition of merit. Let us endeavor to elevate the plane of our competition and strengthen its intensity. Let us, as brethren, be thoroughly possessed of "that noble emulation of who shall best work and best agree." But what plans shall we formulate, what competent methods shall we provide? In reply, I would certainly urge the efficiency of such associations as this. Their proper functions are surely educational and stimulative, and both to a very high degree. We must, of course, acknowledge this human taint of imperfection while we are conscious of the spiritual striving after the ideal, and between the extremes of blundering failure and faultless success, philosophy, experience, wisdom, which is the sum of experiences, points out a practicable and profitable course ; something the human can do, that, while it cannot attain, can at least approximate the ideal. The way is plain, the journey feasible, and the trend is upward.

So it is that it seems to me that meetings such as ours certainly afford one of the best means available to us for beneficial interchange of thought and opinion, for the announcement of important professional discoveries, and for the discussion of interesting and contested points.

Imagine a thoroughly organized system of dental associations, extending over this country, calling upon every dentist in this country to contribute in some form or other his share of value, and form some idea of the stimulative effect. It is certainly possible and probable for such associations to become centers of inspiration, and the idea occurs to me that it might become a point of honor with the younger members of the profession to seek distinction at these meetings, to win their spurs, so to speak, by some professional achievement which should give them standing and recognition among their brethren.

If such considerations as I have urged are reasons sufficiently weighty to justify the hope that dental associations are powerful for good, and capable of still more beneficial development, there still remain other strong reasons for their existence.

We are, unfortunately, still required to emphasize our separation from quackery, and our distinctness as a profession. This contest is, in some regards, wearisome and interminable; but we must reflect that in no land is the doctrine of personal liberty so preached and practiced as among us. To protect the unwary from the clutches of the unskilled requires the proper intervention of the strong arm of the law, and most of us know what it is to seek legislation. Yet, this is a thing that must be accomplished, this legal protection, and we must secure it.

We are interested as a body in the setting up of a proper and sufficient standard of acquirements for all seeking to practice dentistry. This involves the preparation of a good law, its successful enactment, and its thorough execution by competent agents.

Surely, matters like these are not to be left to the professional sense of a few, but vitally affect all, and require the strenuous and capable assistance of all.

It is certainly possible for a well-organized system of associations to create the proper public sentiment regarding this matter, thus securing the proper legislative action, and they should be equally powerful to secure competent, efficient agents to carry the provisions of any such act into their designed effect. And it is proper that they should do it. They should in this especially represent the profession, and contain and pronounce the consensus of the profession's united wisdom. Let us, then, unite heartily and thoroughly in those good works of association which so vitally concern our common interests.

Do not let it be said of us that we are an aggregation of distinct and repellent units, brought together by the temporary adhesion of personal ambition and mutual distrust; but let us coalesce, let us fuse; let the common cause enlist the best efforts of all in united action, and our victory is certain.

In the light of existing conditions, we can no more evade our professional responsibility than our personal.

Accept, then, this plea for the extension and perfection of our associations as my conviction of their power, my faith in their future; a power born of united action of noble and intelligent men seeking a definite and worthy end, a future limited only by the possibilities of our united wisdom and energy.

Dr. H. B. Noble moved that the president's address be referred to the Committee on Publication for discussion. Carried.

Dr. M. F. Finlay, chairman of the Committee on Publication, Voluntary Essays, and Dental Legislation, presented his report, with a list of the papers which had been offered.

Dr. H. B. Noble read a paper on "Ambidextrousness," which will be found on page 442 of the current number.

Discussion.

Dr. W. F. Hunt thought that the subject was an important one. He had felt the desirability of having better use of the left hand, but had never had time to train himself to it. Every dentist must often feel that it is desirable to use the left hand, and the fact that training would allow of its being used should be set plainly before the profession, and especially the students and younger men should be encouraged to acquire better use of it.

Dr. C. T. Lindsay, Washington, had found it possible to use both hands equally, and when he wished to fill a cavity or prepare one which could be better done with the left hand, he took the left side of the chair. He had been taught the use of both hands when working in the laboratory in his student days.

Dr. Williams Donnally, Washington, spoke of suffering from numbness in the left hand produced by holding it still while the other hand was in use. Before rubber-dam was introduced he held napkins, bibulous paper, etc., in the mouth with the left hand while inserting fillings with the right, until the inactive member would become numb and cramped. The use of rubber-dam enabled us to use both hands, and it was a great advantage to train both hands and thus relieve the fatigue of long hours of work.

Dr J. B. Rich, Washington, always used, in filling, two instruments, one in each hand. He had no doubt any one could easily train himself to make all motions with the left hand that he could with the right.

He spoke of the training of the pupils in the schools of design, where they were taught to use both hands in drawing straight and curved lines, and in uniting them in intricate designs. He knew of several instances where the ability to use the left hand had been acquired late in life. It only required a little persistent practice to acquire control over the muscles.

Dr. H. C. Thompson, Washington, claimed that the benefit arising from becoming ambidextrous was not only in the ease and speed gained in work, but that the increased use of the left hand would be a beneficial stimulus to the brain which would increase its power. Any organ not used becomes less capable of exertion, and, as it has been demonstrated that one hemisphere of the brain controls the left part of the body, it follows that to allow that part of the body to remain inactive, or to perform only a subordinate part in the daily activities, will cause a proportionate loss of power to that half of the brain, and a sympathetic loss, too, in the other half.

Dr. David Genese, Baltimore, said there was another disadvantage in the restricted use of one hand, which was that by using it only as an auxiliary to the right hand it acquired a nervous or unconscious habit of hard contraction, when it held any instrument, which was difficult to overcome. His attention was called to this phenomenon by a dentist who turned his attention to music, and who found it almost impossible to grasp an instrument or press the keys with the left hand with the lightness of touch desirable to bring the best results.

Dr. C. L. Goddard, San Francisco, Cal., said the time to improve the left hand was when a new operation is begun or a new business entered upon, so that both hands can be taught the new operation together. In this way the left hand can be used nearly or quite as well as the right with the same training. When he began to practice he used the left hand in malleting, and had no trouble. Some preceptors discouraged the use of the left hand with their students, perhaps with the idea that the delicate sense of touch and nicety of manipulation could not so well be acquired by the right hand if any attention was given to the training of the left.

Dr. B. Holly Smith, Baltimore, thanked the author of the paper and those who had testified in regard to the usefulness of the left hand, and he would take advantage of the suggestions received in the training of his own children. He would see that they were not reproved in the future for the use of the left hand.

Dr. E. A. Bryant thought that the training of the left hand should be brought to the attention of dental students while they were in the college, as many of them, upon completing their course, become assistants in offices before they set up in practice for themselves, and the ability to use both hands would be especially valuable to them while so engaged. He spoke of a lady assistant in a dentist's office who malleted without pause with her left hand while she picked up the gold with the right.

The discussion was closed, and Dr. M. G. Sykes presented the following:

History of a Case of Diseased Antrum.

So very much has already been written on the subject of diseases of the antrum and their treatment, that it seems almost every possible case has been reported; yet I have never seen anything published that would throw any light upon a case which I wish to present for your consideration, the history of which I shall endeavor to give you as correctly as I can.

Some time during 1888 or 1889, a young lady about twenty-eight or thirty years of age, whose general health was anything but good, having been delicate for some years, came to me for treatment. Some years prior to this, she had the right superior second molar extracted, the pulp of which had died under a filling, and it becoming troublesome. After the removal of the tooth, thinking the trouble was over, she thought no more about it, until she began suffering at times with intense pain in the right side of the face, with swelling along the side of the nose and up toward the eye. The pain and swelling were not constant, but every recurrence of them seemed worse than the last. This state of affairs continued for several months, when she consulted a prominent surgeon of Baltimore, who, after diagnosing the case, ordered the removal of the right superior first molar, which was alive and in good condition, and an opening to be made through the socket into the antrum. All the other teeth on that side were in position and in good condition, except the second bicuspid, which was missing, and of which she could give no account. There being a profuse discharge of pus, I began the treatment by syringing the cavity with warm water, followed by injections of antiseptic and disinfectant solutions. I saw her once or twice a day, and after some weeks, the trouble increasing instead of diminishing, I began to change from one medicinal agent to another, until I had about exhausted the entire list of antiseptics and disinfectants. I cannot enumerate the agents in the order in which they were used, but I will endeavor to mention a partial list. Phénol sodique, creasote, carbolic acid, boracic acid both in solution and in powder, sulfate of zinc, chlorid of zinc, permanganate of potash, tincture of iodin, peroxid of hydrogen, dilute nitro-muriatic acid, listerine, bichlorid of mercury, aristol, calomel powder, alcohol, and several others being used without beneficial results, I tried, during the summer of 1892, a sixty per cent. solution of nitrate of silver, repeating the injection every four or five days for several weeks, until I thought the condition of the mucous membrane had been completely changed, but to my sorrow and utter disgust it did no good. Since then nothing but listerine has been used, and there seems to be no decided improvement whatever. My opinion is that either the entire lining membrane of the cavity should be scraped or dissected away, and dependence placed in the formation of new tissues, or a greater portion of the floor of the antrum should be removed in order to gain better access to the cavity.

In presenting this case, Mr. President, I do it not with the intention or expectation of enlightening the members of this meeting on the treatment of diseased antrum, for I feel that in the treatment of this case nothing whatever has been accomplished, except to temporarily lessen the patient's suffering; but more particularly to ascertain if any of the gentlemen present have had experience with a similar case, and if so, what course of treatment was pursued to effect a permanent cure.

Discussion.

Dr. Williams Donnally, Washington, D. C., said that in the history of the case very much, perhaps of a negative character, had been omitted. It is necessary to know what common causes, as nasal polypi, hypertrophy, ulcers, caries, etc., are excluded from the possibilities. The only thing he could say directly to the case was a suggestion of over-treatment, that if the strength of nitrate-of-silver solution is an index of the strength of the numerous other remedies used, he would expect them to produce and perpetuate a pathological condition while continued. Some small part of the antrum, as an ulcer or carious bone, might call for such strong solutions, and he had used a ten per cent. solution of sulfuric acid direct to spots of denuded or carious bone for its solvent and alterative effect.

He had found that a large percentage of the chronic cases he had treated had been overlooked and treatment directed to other supposed causes, notably to nasal catarrh and to indigestion, with consequent impairment of general health. His success had been in proportion to the mildness of the remedies used, most cases requiring only cleanliness and free drainage. After making sure of the latter, treatment usually consists, first, of free spraying or douching, by means of a large bulb-syringe, with peroxid of hydrogen, glycozone, listerine, Dobell's solution, or a 1 to 2000 solution of corrosive sublimate in twenty-five per cent. hydrogen peroxid to seventy-five per cent. cinnamon water, and, for after-treatment, stimulating, astringent, or antiseptic solutions, as indicated by the character of the discharge.

In any case not showing marked improvement in two weeks, he would feel he was not master of the case until he found some cause other than the altered condition of the lining membrane.

He related the case of a lady, some fifty years of age, whose right antrum had been diseased and closed, except for an occasional discharge over the third molar, for two years before coming to him for treatment, at which time there was marked swelling of the face, depression of the ridge, with teeth pointing inside the lower, the roof being so narrowed that a plate used for years, and bearing crowns over bicuspid roots of that side, could not be replaced. After draining the greatly enlarged and distended antrum, a break in the external wall was disclosed which was as large as a silver dime over the cuspid and narrowed down to the width of a pencil as it extended back to the roots of the third molar. Through this break the roots of the two bicuspids and of the third molar were found to be partly absorbed, as was the bone about them to near the margin of the process. Slight pressure applied to the bicuspid root forced it into the antrum. In the treatment of this case, he removed the bicuspids and third molar, washed freely with hydrogen peroxid, scraped smooth, and touched with a ten per cent. solution of sulfuric acid the saw-like edge of the bone, grasped firmly the first molar, and, by outward and upward pressure, brought together the narrow portion of the break.

Exploring the sinus developed nothing but absorption of its walls and almost complete insensibility to the touch of the explorer.

The stimulating treatment indicated was supplied, once in oil of cinnamon, and several times in tincture iodin, full strength. After almost daily treatment for two weeks, offensive discharges could still be detected. He then carefully explored every part of the walls, finding normal cushion-like touch (which was wanting in every part when case was opened), except on one small carious spot in the floor, toward the median line, from the socket of the bicuspids. An application or two of sulfuric acid, ten per cent. solution, was made to that, and thereafter only mild antiseptic and stimulating washes were used. But one opening—through socket of second bicuspid—was maintained for treatment, the others healing nicely in from four to six weeks; and this seeming disposed to close, a new plate, with pointed elevation to project into it, was made and used, with the idea that it was necessary to maintain the artificial until the natural opening became patulous. Not succeeding in this, after a few weeks the edges were freshened, the projection on the plate cut off, and the plate so altered as to press the opening until it closed. Just at that time, three months after treatment was begun, the patient was called to travel with a sick relative, and when the doctor saw the case on her return, some months later, the vent was found closed, and the meatus again performing its function. The doctor referred to a statement of Professor Garretson, advising against allowing vents to close in cases of long-standing stenosis, because in such there is a loss of the ciliated character of the lining membrane, so that its function of carrying secretion against gravity is not again fully restored. Dr. Donnally thinks his experience with this and other similar cases, which have remained seemingly normal for years, would encourage a trial in any case against the advice of even so eminent an authority.

Dr. H. C. Thompson said diseases of the antrum usually resulted from diseases of the teeth, and in their earlier stages would usually yield to mild treatment if drainage was had. It was sometimes difficult to determine where was the best point to enter the antrum to insure drainage. In a case which had been brought to him by a physician of a lady whose upper molars were all absent, the physician told him to enter directly below the zygoma for the lowest point of the antral cavity. Feeling that it was well to make sure of this point, he sought and found an opportunity to examine a collection of over one hundred skulls, and the result was that he found that the most dependent portion of the antrum can be determined accurately, when the buccal teeth have been lost, by drawing two imaginary lines, one continuous with the anterior surface of the body of the maxilla to the alveolus, another with the anterior surface of the zygomatic fossa to the alveolus. The angle of convergence of these two lines will give the most dependent portion of the antrum.

Unless diseases of the antrum are persistently treated from their earlier stages till a cure is effected, the secondary disease will destroy the walls of the cavity so that both nostrils will discharge. He thought systemic treatment should be used with the local treatment.

Dr. David Genese said in all such diseases which were accompanied by pus-formation systemic treatment was necessary if good results were to be reached, and recommended a pill of sulfid of calcium, from one-eighth grain to two grains, to be taken before retiring for five successive nights. This will stop the formation of pus.

Dr. C. C. Harris, Baltimore, described a case of antral trouble in which the patient, after a long course of treatment, had to wear a gold plate and a rubber tube for the sake of drainage. The lady had been under eminent medical treatment, and systemic medication has not been neglected, but the trouble still persists, though all sorts of local treatment have been resorted to. If the tube were left out an hour, it could not be replaced without first stuffing the opening with cotton and letting the swelling of the cotton press the hole open. It was like sores with which we are familiar on other parts of the body which no treatment will cure.

Dr. Sykes, in closing the discussion, said that he had examined very carefully every part of the antrum for dead bone,—not a part the size of a pin-head had been neglected,—and that with all that had been said on the subject he found that he had not received any suggestions of value to the case.

Dr. L. C. F. Hugo read a paper entitled "Non-Cohesive Gold Cylinders: How and Where to Use Them," which will be found on page 433 of the current number.

At the conclusion of Dr. Hugo's paper it was decided to postpone the discussion till the evening session, and the convention adjourned.

Afternoon Session.

The convention was called to order at 2.30 P.M. The president announced that he had received a message to the effect that Professor

R. B. Winder, of Baltimore, was dangerously ill. On motion, the convention resolved that an expression of their sympathy for Dr. Winder, with their best wishes for his speedy recovery, should be sent.

The Committee on Dental Education, Literature, and Dental Nomenclature presented a paper by Dr. Edward Nelson, of Frederick, Md., chairman of the committee, of which an abstract follows :

DENTAL LITERATURE.

The essayist spoke of the difficulty of giving an exact definition of what constitutes literature, and quoted the views of various authors upon the subject, including Fichte, De Quincey, Disraeli, and Emerson. He was inclined to adopt the idea of the latter two, which practically resolved the literature of a profession into the biographies of its literary men. He referred to the great antiquity of dental art as revealed among the discoveries of Egyptian archæology, and held that the possession of a high degree of knowledge of dental matters was justly inferable from their known enlightenment and advanced civilization in respect to the arts and sciences which were and are directly tributary to dentistry. The destruction of the Alexandrian library by Caliph Omar I he believed had deprived us of the specific records of the advanced conditions of dental art as they must have existed in the early Egyptian era. He then continued :

From 1536 to 1884 there were published in Germany, Austria, Holland, Norway, Sweden, Denmark, and German Switzerland over seven hundred and fifty works on dentistry ; from 1582 to 1856, in France, Belgium, and French Switzerland, seven hundred and eleven ; from 1557 to 1885, in Spain and Italy, forty-six ; in Great Britain and Ireland, two hundred and thirty ; and from 1801 to 1890, in America, over three hundred ; in all, over two thousand and fifty. Of these, among the most noteworthy are : "A Treatise De Dentibus," by Eustachius ; "The Anatomy of the Teeth, with Their Diseases and Remedies," by Hemard ; a work on surgery, by Paré ; "Dental Surgery," by Fauchard ; "An Essay on Diseases of the Teeth," by Bunon ; "A Treatise on the Pain and Accidents Preceding and Acpanying the Eruption of Children's First Teeth," by Lecluse ; "A Treatise on the Diseases and Surgical Operations of the Mouth, etc.," by Jourdain ; "Deformities and Disorders of the Teeth and Gums, with the Most Rational Methods of their Treatment," by Berdmore ; "The Natural History of the Human Teeth," by John Hunter ; "The Natural History of the Human Teeth, the Changes Taking Place during Second Dentition, and Mode of Treatment to Prevent Irregularities," by Fox ; "An Essay on Diseases of the Jaw and Their Treatment," "Treatment of Denuded Nerves," and other works, by Koecker ; "Anatomy, Physiology, and Diseases of the Teeth," by Bell ; "Development and Structure of the Teeth and Epithelium," by Nasmyth ; "Surgical, Mechanical, and Medical Treatment of the Teeth, including Dental Mechanics," by Robinson ; "A System of Dental Surgery," by John Tomes ; "A Manual of Dental Anatomy, Human and Comparative," by Charles S. Tomes ; "A Practical Treatise on Dental Medicine," by Bond ; "Dental Medicine, a Manual of Dental Materia Medica and Therapeutics," by Gorgas ; "The Principles and Practice of Dentistry, including

Anatomy, Physiology, Therapeutics, Dental Surgery, and Mechanism," "A Dictionary of Medicine and Dental Surgery," by Harris; and "Dental Chemistry," by Piggott. To these must be added, as a valuable contribution to the literature of the profession, the numerous periodicals devoted to dental science in all its departments, which have been established all over this country and Europe, prominent among which are the *American Journal of Dental Science*, DENTAL COSMOS, *International Dental Journal*, *Dental Office and Laboratory*, *Odontological Journal*, *Items of Interest*, *Southern Dental Journal and Luminary*, *Dental Review*, and *Dental Eclectic.*

The greatest impulse, however, given to dental literature was the founding of the Baltimore College of Dental Surgery, in 1839, by Chapin A. Harris, Horace H. Hayden, Thomas E. Bond, Jr., and Willis Baxley. This was the first dental college ever established. In the same year the *American Journal of Dental Science* was established, and the American Society of Dental Surgeons founded.

The impulse thus given was soon felt throughout the whole country,—indeed the whole world,—and colleges sprung up in many of the states. To these were soon added numerous dental societies and associations, which are yearly sending forth a stream of literature replete with solid learning and scientific research, and which compare favorably with the best productions of the medical science.

From a rude art, or trade, dentistry has been elevated to the position of a learned profession; her professors are men of general information, as well as of scientific attainment; her matriculants are coming, more and more every year, from our best colleges and seminaries of polite learning, and the impression which has thus been made on society is best evidenced by the correct knowledge of general principles which obtains, and by the intelligent popular appreciation of the services and ministrations of dental practitioners.

It will be seen, even by this brief and imperfect survey, that there have been three epochs in the history of dental literature: the first dating back beyond the time of the Ptolemies, of which we have only faint hints through the mouths of Egyptian mummies, the excavations among buried ruins, and inscriptions on decayed monuments, of what was more fully recorded in the volumes of the Alexandrian library; the second, in the revival of letters in the sixteenth century; and the third and greatest, in the establishment in Baltimore, in 1839, of the *American Journal of Dental Science*, and the chartering by the state of Maryland of the first dental college.

The same committee presented a paper by Dr. L. C. F. Hugo, of Washington, D. C., entitled,—

DENTAL NOMENCLATURE.

The subject of dental nomenclature is one highly deserving our earnest attention. Dental terminology has not in character kept pace with the progress of our science. Its chaotic, unscientific condition has for ten years past been recognized, but thus far efforts to correct the existing confusion have been but sparingly successful. The profession feels that as the dental specialty is assuming the proportions and dignity of a scientific pursuit, there should be commensurate progress in exact and uniform terminology.

Dr. Joseph Thomas has truly said in this respect, "Every true scientist will admit that in scientific statements or descriptions, precision or exactness of language is of the very first importance, for without precision of language it is impossible to impart exact and accurate knowledge."

In considering this subject, we are met with a multiplicity of terms used to designate one and the same thing by even the good writers of the profession. Then in the every-day technical vocabulary there are localisms to which their users pertinaceously cling. Here is the difficulty. Few older practitioners, that have for example been accustomed to calling socket catarrh Riggs's disease, are likely to change to hæmato- or ptyalo-calcic pericementitis, however exact and self-defining the latter may be.

Reform in this direction can hardly be expected of the older practitioners. It should really be instituted before the use of a wrong, vague, or inadequate term has fastened itself upon the dentist's technical vocabulary. The reform must begin with the student.

If the faculties of our colleges would take concerted action in this matter, devise and fix upon exact terminology, and conscientiously teach it, the student would become familiarized with the terms and be likely to permanently adopt them. This has reference, of course, so far as we are concerned, to the English terminology. The Latin or Greek, to be recognized the world over, must be arranged by international agreement. Material aid in bringing about the adoption of what may approve itself as satisfactory will be given by the dental periodical publications. For the present, however, we must content ourselves with suggestions.

Two most notable papers on dental nomenclature were read at the World's Columbian Dental Congress. That of Dr. Black treated of the surface-names of teeth, and Dr. Newkirk's of dental positions and arch-forms. Your committee could hardly do better than adopt these papers as a report, though in a few particulars changes may be made.

The English or anglicised Latin names of the teeth have been quite generally agreed upon by English-speaking dentists. It is unnecessary to specify here any further than to give them as follows :

Incisors—central and lateral ;
Cuspids ;
Bicuspids—first and second ;
Molars—first, second, and third.

Such senseless names as canine, eye, stomach, and wisdom-teeth are fortunately dropping into disuse.

As to the surfaces of the teeth, the committee would recommend the following :

Facial. The aspect of a tooth presenting to the vestibule might be called facial, thus making one term serve for the two now in use, labial and buccal.

Lingual. The surface of a tooth opposite to that designated is rapidly becoming known as the lingual, palatal being discontinued.

Approximal. The contiguous surfaces are called approximal, proximal, approximate, and proximate. The first, accepted as legitimate by the latest dictionary, the Standard, has received the sanction of extensive usage, and of men who have made careful etymological investigation. This term has a peculiarly dental application ; the others have special significance in medicine, chemistry, etc. Approximal obviously should have the preference. But, if a new term must be had, we would recommend *contigual* as a suitable one. The specific designations *mesial* and *distal* have properly become fixed in our vocabulary.

Occlusal. The terminal surfaces of the teeth have been called by this term. In the normal occlusion, however, the ends of the oral teeth do not strictly occlude with those of the opposite jaw. Therefore, to be more exact, *morsal* has been suggested for these surfaces. It represents the idea fully ; it is simple and perspicuous, doing away with occlusal, incisal, grinding-surfaces, cutting-edge, etc.

The surfaces next the gum are denominated by prefixing *cervico* to the terms given, or to their combinations : as, cervico-facial would designate what has been known as gingivo-labial or gingivo-buccal.

The names for the cusps, fissures, and angles are so readily suggested by the terms for the neighboring surfaces that illustrative examples are unnecessary. In making the compound terms involving the approximal surfaces, mesio- and disto- should be the prefixes.

As to the nomenclature of dental position and arch-forms, though Dr. Newkirk's work seems severely scientific, we hope that as it is the best thus far offered, it may be adopted. His system is logical and comprehensive.

There are a few minor suggestions that your committee would make.

We speak of open and blind abscesses. More descriptive and exact terms are *fistulous* and *non-fistulous*.

In place of so pretentious and unmeaning a word as submarine, as applied to fillings that cannot be kept dry during insertion, *subsalival* would be better.

Alloy is sometimes used as an euphemism for *amalgam*. The latter term should have the preference, as it is more exact. Alloy as sometimes used is supposed to juggle the patient's mind into a vague idea of its superiority over vulgar amalgam.

We hear of rubber fillings. There is no such thing in dentistry. *Gutta-percha* is meant. The two substances differ materially from each other, and for our purpose are not interchangeable.

The term "Riggs's Disease" gives in itself no hint of the affection it represents. In place of it, various self-defining terms have been suggested ; such as socket catarrh, pyorrhea alveolaris, phagedenic pericementitis, suppurative alveolitis, ptyalo- and hæmato-calcic pericementitis, etc. All these are more or less accurately descriptive of some phase of the affection named. But taking it all in all, for an every-day English term "Riggs's Disease" recommends itself for brevity, well-understood application, and the absence of any attempt to define an affection whose etiology is still in so much doubt.

By almost imperceptible changes an improvement in dental nomenclature is going on. But a dozen years ago the attempt to substitute the term *prosthetic* dentistry for mechanical dentistry was stubbornly resisted. Yet to-day it is extensively employed, and promises to wholly supplant the old vague designation.

A radical change is impossible. The body of the profession is reluctant to accept innovations. We repeat, then, our suggestion that the college faculties take some steps toward concertedly working out a system of English dental nomenclature. The forming of a cosmopolite terminology we must leave to the next generation.

At the conclusion of Dr. Hugo's paper, as the hour for clinics had come, the remainder of the afternoon was given up to Dr. V. H. Jackson, of New York, who gave a full exposition of his system of regulating by means of base-wire and wire cribs or clasps as anchorage, and wire springs as power to force teeth to desired position.

For the purpose of making every part easily understood, he gave an explanatory lecture the first hour, using a well-executed chart of about forty varieties of malposition in graphic illustration. He followed this with an exhibition of numerous models and appliances of widely varying practical cases, with their history, from his own practice. By this means the adaptability of the system to almost every form of irregularity was demonstrated, as cases of almost every conceivable difficulty were shown by models to have been successfully managed.

The second day Dr. Jackson demonstrated the method of manipulating the wire of different metals in forming partial clasps, cribs, base-wire, and springs, and in making such changes as are required by the progressive movement of the teeth.

Evening Session.

The meeting was called to order at 8 P.M., and Dr. A. J. Brown read the following report of a case of neuralgic trouble which he attributed to a strangulated nerve.

STRANGULATED NERVE.

The patient, a prominent physician in Washington, was suffering with pain in the left superior first bicuspid. The tooth had been filled with amalgam for about five years, and up to this time was perfectly comfortable.

When it began to be painful, the filling was removed and the tooth treated for about ten days, but without giving relief.

The doctor, being a very busy man, was much annoyed at the continual pain, and decided to have the offending tooth extracted, which was done. When asked if the pain subsided after the tooth was extracted, he replied that he thought it was better for a day or two, but from that time on it grew gradually worse. This was previous to my knowledge of the case. On January 14, one week after the tooth was extracted, the doctor called at my office, early in the morning, nearly frantic with pain. On examination of the mouth, the second bicuspid and first molar were found in place, and, as far as could be seen, in good condition. The second bicuspid had a small amalgam filling on the anterior approximal surface, but the molar was sound. The gums were in good condition, no disease being apparent. There was slight soreness in the region of the extracted tooth, but not more than would ordinarily be expected after extraction, and nothing to attract especial attention to that point.

The next step was an examination for dead pulps, by the usual methods of tapping with an instrument and syringing with both hot and cold water, there being no discoloration manifest in any of the teeth. All this time the patient was suffering the most intense pain over the whole side of the face. Attention was then directed to the socket from which the tooth had been extracted. The doctor insisted that the trouble was not in the socket; the tooth was out and could not hurt; but on introducing a probe into the socket, it showed instantly that the seat of the pain was there.

The socket was first syringed with warm water, and then medicines were introduced. Carbolic acid, creasote, pyrozone, and various mixtures with the essential oils were tried, but with no good results.

Having used a mixture of iodoform and creasote successfully in allaying pain in exposed pulps, this was next applied, with the most gratifying results. Almost as soon as introduced the pain began to subside, and in fifteen minutes the patient was comparatively easy. The iodoform was mixed with creasote to the consistency of cream, and applied to the socket on a pledget of cotton, and sealed with sandarac varnish.

This application was made about ten o'clock in the morning, the parts remaining comfortable until early the next morning. After the doctor was out of bed, while dressing, the pain returned with as much severity as on the previous day.

A hasty visit to the office and a second application of the mixture of iodoform and creasote again afforded relief. The next morning, the pain recurring as before, the socket was cauterized with stick caustic, and a dressing of carbolic acid was applied, as the doctor attributed a weak feeling in his knees to the use of the iodoform. But in an hour he was back in the office in great pain. The iodoform being applied, the pain subsided in about a half-hour, and the patient remained comfortable for the next twenty-four hours, or rather until the hour for rising the next morning, when, as before, while dressing the pain returned.

On the fourth morning a decided soreness was felt in the second bicuspid. This tooth was in a comparatively good condition, having a small amalgam filling in the anterior approximal surface, as before stated. This filling was removed, and with a spear-pointed drill an opening was made into the pulp-chamber without causing any additional suffering. The pulp here was found to be very much congested, but not very sensitive. The pulp was removed, but when a broach was introduced, the pulp-tissue in the canals was found to be very sensitive. Arsenic and cocain were applied and the patient dismissed, only to return late in the afternoon with the same severe pain. The arsenic was removed, and that tooth dressed with creasote. Cocain was applied to the socket until the pain began to subside, when the dressing of iodoform was again applied, with the usual good result. In the mean time consultations were held with some of our most noted surgeons, who, in every instance, approved of the whole treatment, but advised constitutional treatment in addition. At the next visit, the pain having returned as before, the second bicuspid remaining very sore, and not having an antagonist, it was decided to remove it, in the hope that the removal would stretch the nerve of the adjoining cavity, and that, together with the hemorrhage, would relieve the tension on it and secure relief.

The patient was taken to a specialist, gas administered, and the tooth extracted, but without bringing the results hoped for, as the pain returned the next morning at the usual hour, with unusual severity. It was then determined to free the nerve from the socket.

This operation had been deferred until this time, in the hope that the palliative treatment would secure permanent relief. A strong solution of cocain was prepared and forced well up in the socket to the apex. After partial anesthesia was produced, a round bur was selected and tried in the socket, until it could be felt against the nerve, then the distance it went in was carefully marked on the shank. More cocain was introduced, until the touch of the probe showed insensibility. The bur was then run at a high rate of speed, and the socket burred out to the depth of a quarter of an inch. This caused some pain and much hemorrhage. Examination of the bur with a magnifying glass, immediately after using, showed small particles of tissue adhering to it. The wound was then dressed with campho-phenique.

The morning following this operation was waited for with considerable anxiety by the patient and myself. As the time for rising was the signal for the return of the pain, the doctor felt very anxious as the hour drew near. To use his own words, "I lay awake for at least a half-hour, dreading to move for fear it would bring on the pain." But when he did arise, the pain did not return. The side of the face was sore and stiff, but there was no acute pain as formerly. Campho-phenique was used from time to time until the wound was allowed to heal by granulation. Although some neuralgic pain was felt off and on for about a week, no severe pain was experienced at any time after the operation, and now, after three months have elapsed, the face is entirely comfortable, except a slight facial neuralgia felt only on damp days.

The doctor was just recovering from a severe attack of "la grippe," during which he had faithfully attended to his large practice, exposing himself to all kinds of weather, and only stopping when under heavy fever or in the most acute pain. We attribute the original pain in the tooth to the action of the grippe on the facial nerve, which caused it to be badly congested, so that when the tooth was extracted this nerve did not break away at the apex of the tooth, but was drawn into the socket, and being so congested, could not free itself, thus putting that entire branch on a strain, and thereby causing intense suffering.

Dr. G. H. Claude said that he thought Dr. Brown's diagnosis of "strangulated nerve" was wrong. The periodical return of the pain would suggest that it was attributable to the grippe or other malarial influence. The mere fact that the nerve was stretched would not account for the pain.

Dr. Brown said that the cause of the pain had puzzled him, and as the only satisfactory cause he had ascribed it to the strangulation of the nerve.

Dr. Emory A. Bryant read a paper upon bridge-work, and proceeded to explain the advantages of his methods and system, following which he alluded to the numerous operations in dentistry in which the instruments used in attaching the porcelain facings of the six anterior teeth could be used to great advantage. He laid particular stress on the fact that the facings of any of the six anterior teeth of a bridge, no matter under what system or method it was made, could be replaced if broken, without removal of the bridge or crown from the mouth, with but little trouble or cost, and when repaired in this way is as strong and artistic as the original which it replaced.

His method of repairing a facing broken from a bridge or crown is as follows: Select the facing to be attached, color, size, and shape to suit, grind or clip off the pins extending out from the space from which the original facing was broken from the bridge, and smooth this space so as to present a flat surface. Drill two holes through the backing of the bridge for the reception of the pins of the new facing to be attached, and as near the size of the pins as possible. With the countersink bur in the right-angle hand-piece, countersink from the inside until the bur comes through to the front, but not far enough to enlarge the holes (Fig. 1). Now try on and fit the facing, grinding the backing or the tooth to accomplish this result. When fitted to suit, cut the threads on the pins of the facing to be used, first with the larger size die, then with the smaller, the latter being the perfect thread and corresponding to the nuts. In cutting this thread, care should be taken not to force it too fast, and a little oil should be used, otherwise you will twist off the pins in the die, and it is difficult to remove them, besides losing the use of the facing.

FIG. 1.

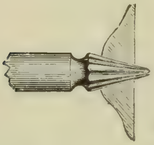


FIG. 2.

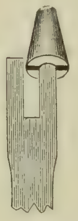


FIG. 3.

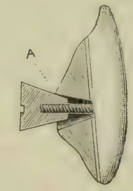
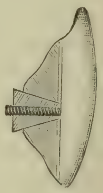


FIG. 4.



Now select two nuts, and try them to see that they will go to place on the pins of the facing before putting the facing in place, laying the nuts selected in such position that you will be able to place them upon the same pin which you tried them on. Place the facing in position, holding same close and tight with the thumb of the left hand, pick up one of the nuts by inserting one of the legs of the screw-driver into the opening (Fig. 2), carrying the nut to the pin in this manner, and starting it upon the thread, then change to the cut in the nut for the reception of the screw-driver, and screw to place, not using any force to do so, doing likewise with the other nut. When the two are in place, if they are not quite down, hold the facing firmly with the thumb of the left hand, then screw up first one nut, then the other, till entirely home. If you undertake to screw up one entirely at first, and there happens to be the least tipping upon the other side, when you screw the other nut down tight it will break the facing. Therefore you must understand it is essential to screw each down equally. Do not use undue force with the screw-driver after the tooth is home, with the idea of making it extra tight, for you are liable to pull the pins out of the facing. The strength of the threads being stronger than that of the porcelain, the latter will give first.

When the nuts are down tight, grind off the extending parts with the corundum wheel and smooth up with cuttle-fish or sand-paper disks. This whole operation consumes about fifteen to twenty-five minutes' time. With these instruments you are enabled to arrange new facings where the gum happens to have receded away, or where they encroach upon the gum. By baking a little gum upon the facings to be used, you can fill any irregularities at the junction of the gum and facing, thus doing away with the open spaces usually seen in bridges consisting of the six anterior teeth. In fact, these instruments are indispensable to any dentist who does bridge-work or ever contemplates doing it. They can be used to great advantage in many other operations in dentistry, covering more ground than any other set of instruments ever devised for the use of the profession.

If the pins are bent and the nut strikes the edge as at A, Fig. 3, straighten by pulling the nut and pin toward side it does not strike, till it goes home (Fig. 4).

Dr. David Genese said that the chief difference between this and ordinary bridge-work was in the way of fastening the facing on by the means of cylinders, and the facings would crack in this method as well as any other, though repair was easy.

Dr. T. S. Waters protested against the statement that Dr. Low was the originator of bridge-work. He had had occasion to remove a piece of bridge-work made by Dr. Stinson, of Baltimore, which was made more than forty years ago.

Dr. W. S. Twilley described a method of constructing a piece of bridge-work somewhat similar to that shown by Dr. Bryant, except that instead of having cylinders and a hollow backing to his tooth he used a solid solder back with holes in it, which he made by using pieces of the lead from a small-sized lead-pencil put into place and the solder flowed around them. The lead being refractory to heat was not affected, and could afterwards be easily bored out, and the pins would exactly fit the holes. The ends of the pins were riveted to hold them secure.

In closing the discussion, Dr. Bryant said that while it was true that there were other inventors of bridge-work, it was equally true that Dr. Low was the first to bring it to the attention of the profession, and he believed that all possible credit should be given Dr. Low for this. Others devised bridges, but kept them carefully to themselves.

In regard to the device described by Dr. Twilley as compared to his own, the advantages seemed to be decidedly with his. First, the cost would be about one dollar and fifty cents less per tooth for his because of the hollow back, and he would think in the event that the piece would need repair, the hammering required to rivet up the pins would be painful and annoying to the patient.

Dr. L. E. Hess read the following report of a case in practice:

In order to demonstrate the importance of dental science in connection with the practice of medicine, I would call your attention to the following interesting and remarkable case:

It frequently occurs that constitutional diseases which have long baffled the skill of physicians have been greatly benefited, if not entirely cured, upon application of dental treatment.

The case to which I refer is that of Miss Bessie C., of Baltimore.

Only a brief history of the case could be obtained, on account of the unintelligence of the patient. She had suffered two and one-half years from epilepsy, having attacks at times as frequent in number as six a day, and rarely less than as many per week. There was, however, no history of heredity or of syphilis. The girl had been treated by prominent physicians of this city, who, it appears, could do little more than afford temporary relief, the attacks invariably recurring after treatment.

After suffering nearly two and one-half years, at which time the girl was dull, dejected, and greatly depressed, she fortunately placed herself under treatment of a physician who, in diagnosing her case, discovered that her most prominent symptom was indigestion, as prior to an attack she always had intense pain in her stomach. Upon treatment for indigestion, the case was again somewhat improved, inasmuch as there were no attacks during the treatment, but they returned when the treatment was withdrawn.

The latter physician, a friend of mine, in relating the case to me, said that if he could cure the indigestion he could no doubt cure the epilepsy.

I inquired for the cause of the indigestion, and at once suggested that an examination of the mouth and dental organs be made, as decayed and loosened teeth greatly favor imperfect mastication and consequent indigestion.

Upon examination, a few days later, I found the teeth to be in such a condition that when the girl made an attempt to masticate her food the pain caused was so intense that she was forced to swallow her food without its being chewed, thereby giving to the stomach work which is intended for the mouth. At this time I extracted four teeth, two having the pulps exposed, and two being abscessed. Three days later I extracted two more having diseased roots, and subsequently inserted fifteen fillings and four artificial teeth.

During this operation and up to the present time, which is now four months, there has been no sign of an epileptic attack. The patient has given up use of medicine and drugs, is now gaining in weight, has a good, healthy color, is brighter, more cheerful, enjoys life, and is wonderfully benefited in every way. This I consider sufficient to explain the importance of dental treatment in connection with medical treatment. I hope the day is not far off when it will be as common a question among physicians to "let me see your teeth" as it now is to "let me see your tongue."

There was no discussion of Dr. Hess's case, and Dr. L. Ashley Faught, of Philadelphia, then read a paper entitled "Uric Acid, and the Dental Diseases of the Gouty Diathesis," which will be found at page 439 of the current number.

Discussion.

Dr. Williams Donnally said, while some of the points brought out in the paper were new to him, he felt that he could accept the theory that gouty troubles are not always brought on by high living, though physicians usually find it more prevalent among those who live too well. He had never heard it said that it was brought on by too much hard work or too much anxiety. If erosion of the teeth is due to the influence of uric acid, it is because the acid attacks the teeth from the outside. Dr. Marshall, some three or four years ago, said if the deposit from around the teeth in cases of pyorrhea was ever carefully analyzed, it would be found to be composed of urates.

Dr. J. W. Davis had never looked into the theory, but had been a victim of uric-acid trouble. Up until last December he had never been sick, but one day in that month, on starting home from his office, he felt a severe twitch of pain in his knee, and when he got home it returned, and for twenty-four hours the pain was simply inexpressible. Upon examination, his physician told him it was inflammatory rheumatism, due to uric-acid trouble, and that it was on account of the lack of sufficient exercise. After the attack of rheumatism, he had had trouble with his eyes. While operating he would feel inclined to look away from his work, or to rub his hand over his eyes. This frightened him, and he went to an oculist. Glasses were prescribed, and for a while they relieved the eyes; but the same trouble returning, he visited the oculist again, and when he learned of his attack of rheumatism the eye-trouble was charged to the same cause. Since then he is careful to take more exercise in the open air, and to avoid eating those things considered unfavorable.

Dr. Faught thought dentists should realize the importance that this subject is to them personally, and they should so regulate their habits and their diet as to escape the train of evils described in the paper. He thought there was a connection between the gouty diathesis and erosion of the teeth and pyorrhea. Erosion is usually found in those who have trouble with their liver. He thought it best to avoid the use of alcoholic and malt liquors and an excessive meat diet, and to be careful to get sufficient exercise, and thus lessen the liability to these troubles.

Dr. G. H. Claude mentioned the case of a physician who had gout for a number of years, and who lost all his teeth. The teeth were not eroded, but their roots were covered with a gouty deposit.

(To be continued.)

WOMAN'S DENTAL ASSOCIATION OF THE UNITED STATES.

The regular monthly meeting was held May 5, 1894, at 1602 Arch street, Philadelphia, Pa.; the president, Dr. Anna T. Focht, in the chair.

Dr. James Truman gave an interesting and instructive talk on Dental Pathology.

The next meeting will be held June 2, 1894, at 1300 Arch street, Philadelphia.

EMILY W. WYETH, *Recording Secretary*,
3920 Fairmount avenue, Philadelphia.

HARRIS DENTAL ASSOCIATION.

At the twenty-seventh annual meeting of the Harris Dental Association, held May 3, 1894, at the office of the secretary, in Lancaster, Pa., the following named were elected to fill the various offices for the coming year: Dr. J. D. Heiges, York, president; Dr. E. M. Zell, Oak Hill, vice-president; Dr. H. D. Knight, Lancaster, treasurer; Dr. William N. Amer, Lancaster, secretary.

WILLIAM N. AMER, *Secretary*.

DENTAL COLLEGE COMMENCEMENTS.

UNIVERSITY OF BUFFALO—DENTAL DEPARTMENT.

THE second annual commencement exercises of the Dental Department of the University of Buffalo were held, in connection with those of the Medical and Pharmacal Departments, in Music Hall, in the city of Buffalo, on the evening of Tuesday, May 1, 1894. The examinations before the Board of Curators (comprising the State Dental Examining Board) took place during the day, and at their close the following candidates for graduation were recommended to the chancellor for the degree of Doctor of Dental Surgery, which was accordingly conferred upon them: Arthur G. Bullock, Joseph L. Povall, Joseph W. Beach, Seymour E. MacDougall, Frank L. Sibley, William H. Snider.

The session opened September 25, 1893, and closed May 1, 1894, after a full term of seven months.

The number of matriculates was eighty-six.

The next term will open September 24, 1894.

COLUMBIAN UNIVERSITY—DENTAL DEPARTMENT.

THE seventh annual commencement of the Dental Department of the Columbian University was held at University Hall, Washington, D. C., on Thursday, May 3, 1894, at 8.30 P.M.

The address to the graduates was delivered by Professor R. B. Donaldson, D.D.S., and the valedictory by John H. Galloway, D.D.S.

The number of matriculates for the session was twenty-eight.

The degree of D.D.S. was conferred on the following graduates by J. C. Welling, LL.D., president of the university:

NAME.	STATE.	NAME.	STATE.
Chester H. Beatty	Dist. of Col.	Herbert MacNamee	New York.
John H. Galloway	Iowa.	Frederick W. Parker	New York.
Walter A. Low	Virginia.	Charles S. Rice, M.D.	Pennsylvania.
William A. Lyon	Connecticut.	T. Guy Songster	Dist. of Col.

ROYAL COLLEGE OF DENTAL SURGEONS OF ONTARIO.

FOR the session of 1893–94 the students in attendance are: Freshmen, 40; juniors, 22; seniors, 36. The following-named passed final examination and received certificates to practice dentistry in the Province of Ontario and the title of L.D.S.:

Alton Anderson.
C. N. Abbott.
J. W. Bell.
F. E. Beemer.
J. D. Cameron.
M. F. Cross.
Charles Cobban.
Charles Colter.
Donald Davidson.
G. A. Dewar.
W. R. Greene.
H. A. Galloway.
F. G. Hughes.
V. H. Lyon.
A. A. McKenzie.
J. R. Mitchell.
D. Marshall.
J. McKnight.
A. E. McCordick.
G. A. Newton.
B. F. Nicholls.
G. R. Patterson.
R. J. Read.
W. A. Scott.
E. A. Totten.
H. P. Thompson.
W. T. Wood.
A. E. Webster.
F. L. Wood.

All of the Province of Ontario, Canada.

No formal commencement is held.

UNIVERSITY OF IOWA—DENTAL DEPARTMENT.

THE twelfth annual commencement exercises of the Dental Department of the State University of Iowa were held at the Opera House, Iowa City, Iowa, on Thursday evening, March 15, 1894.

The annual address was delivered by H. E. Downer, A.B.

The number of matriculates for the session was one hundred and forty-eight.

The degree of D.D.S. was conferred on the following graduates by Charles A. Schaeffer, Ph.D., president of the university:

NAME.	STATE.
G. S. Archer	Iowa.
Maude Baldwin	Wisconsin.
R. W. Baldwin	Wisconsin.
O. H. Bemis	Minnesota.
W. G. Bernard	Washington.
Mallie R. Bowman	Iowa.
H. H. Belding	Iowa.
Charles W. Bruner	Iowa.
M. Clark	Illinois.
H. Daily	Nebraska.
S. J. Evans	Iowa.
E. H. Hollister	Iowa.
A. A. Harris	Iowa.
Gard Hicks	Iowa.
L. H. Hinkley	Iowa.
Adel Homer	Iowa.
S. L. Ingham	Iowa.
W. B. Jayne	Iowa.
H. J. Joy	Iowa.
W. D. McCabe	Iowa.
B. H. McKeeby	Iowa.
F. E. Miller	Iowa.
E. V. Marsh	S. Dakota.
W. W. Orebaugh	Iowa.
W. A. Pegg	Pennsylvania.
J. B. Pherrin	Iowa.
M. C. Reno	Iowa.
J. E. Rose	Iowa.
J. I. Thompson	Iowa.
G. A. Vawter	Illinois.
W. W. Wold	Minnesota.

SOUTHERN MEDICAL COLLEGE—DENTAL DEPARTMENT.

THE seventh annual commencement exercises of the Dental Department of the Southern Medical College were held in College Hall, Atlanta, Ga., February 27, 1894.

The valedictory address was delivered by W. C. Mattox, and the annual address to the students by T. W. Latham.

The number of matriculates for the session was thirty-one.

The degree of D.D.S. was conferred on the following graduates by T. S. Powell, M.D., president of the board of trustees:

W. B. Fuller, Florida; Arno Knorr, Georgia; W. C. Mattox, Tennessee; W. H. Wooldridge, Texas.

NORTHWESTERN UNIVERSITY DENTAL SCHOOL.

THE commencement exercises of the Northwestern University Dental School were held on the afternoon of April 24, 1894, at Central Music Hall, Chicago, Ill. The number of matriculates for the session was ninety-five. Following are the names of the graduates:

Lucien H. Arnold.
William S. Bagley.
Samuel A. Bell.
Edward K. Bennington.
Leander R. Brown.
Benjamin F. Ells.
Charles H. Eldred.
Louis A. Edwards.
Frederick W. Fritsche.
Earl V. Harvey.
R. Leslie Hopkins.
Philip F. Kittoe.
Louis Ladewich.
Charles C. Lipe.
William S. Lewis.
Frederick W. Marriett.
Paul G. Maxon.
A. L. Oberndorf.
Casper P. Pfaff.
H. Edwin Reid.
Aurin R. Shaw.
Charles M. Smith.
Edward H. Smith.
Claude B. Warner.
Herbert D. Wilson.

BALTIMORE COLLEGE OF DENTAL SURGERY.

THE fifty-fourth annual commencement exercises of the Baltimore College of Dental Surgery were held at Albaugh's Lyceum Theater, Baltimore, Md., on Tuesday evening, March 20, 1894.

The annual oration was delivered by Rev. R. H. Payne, and the valedictory by E. Hoffmeister, Ph.D.

The number of matriculates for the session was one hundred and forty-six.

The degree of D.D.S. was conferred on the following graduates by Professor R. B. Winder, dean of the college:

NAME.	STATE OR COUNTRY.
Bernard Bar	Maryland.
Thomas E. Black	North Carolina.
Ellery P. Blanchard	Maine.
Emmet J. Collins	Georgia.
Caleb Dorsey	Maryland.
Adelard J. Fortier	Rhode Island.
Wilbert E. Foster	Texas.
Archie R. Gardner	Montana.
F. E. Hawkesworth	Canada.
E. Hoffmeister, Ph.D.	Maryland.
Chas. Hutchinson	Virginia.
Arthur J. Kiser	Ohio.
Almus Owen	Texas.
David B. Payne	New York.
Elton Perry	Texas.
Wm. L. Peters	Massachusetts.
Winston Stephens	Florida.
Geo. E. Thweatt	Virginia.
Robt. S. Corse, Jr.	Maryland.
Jas. H. Cowen	New York.
Fred. N. Damon	Massachusetts.
Wm. P. Davis	Mississippi.
Thos. M. Guier	Maryland.
Byron F. Hadley	Massachusetts.
Al. C. Hafke, D D S.	Germany.
Wm. S. Hamilton	Georgia.
Louis Klingelhoffer	Ohio.
G. Herman Kopperl	Texas.
Chas. B McCue	Maryland.
Wm. G. Mizell, Jr.	North Carolina.
David S. Ray	North Carolina.
Nicholas E. Rierson	North Carolina.
Jno. G. Schmetzer	South Carolina.
Geo. E. Shattuck	Mississippi.
Chas. R. Twilley	Maryland.
Wm. F. Walz	Virginia.
Danl. B. Williams	Pennsylvania.

CINCINNATI COLLEGE OF DENTAL SURGERY.

THE commencement exercises of the Cincinnati College of Dental Surgery were held at the Y. M. C. A. Building, Cincinnati, O., on Monday evening, April 2, 1894.

The valedictory address was delivered by Professor Albert V. Phelps, M.D.

The number of matriculates for the session was eighteen.

The degree of D.D.S. was conferred on the following graduates by Hon. Francis B. James, LL.B., president of the board of trustees:

NAME.	STATE.
D. R. Anderson	Ohio.
Chas. E. Apple	Ohio.
H. R. Hammond	Ohio.
Wm. P. Murray	Ohio.
John F. Zinselmeier	Ohio.

CLEVELAND UNIVERSITY—DENTAL DEPARTMENT.

THE commencement exercises of the dental department of the Cleveland University of Medicine and Surgery were held in Cleveland, Ohio, March 20, 1894. Following are the names of the graduating class:

J. G. Colton	Ohio.
M. E. Fenton	Ohio.
Fred. A. Herrick	Pennsylvania.
W. G. Johnson	Ohio.

OHIO MEDICAL UNIVERSITY—DEPARTMENT OF DENTISTRY.

THE Department of Dentistry of the Ohio Medical University held its second annual commencement exercises (in connection with those of the departments of medicine and pharmacy) in the Board of Trade Auditorium, Columbus, Ohio, March 13, 1894.

The number of matriculates for the session was twenty-three.

The degree of D.D.S. was conferred on J. S. Elder, of Ohio, and James Whiting, of Canada.

BIRMINGHAM DENTAL COLLEGE.

THE commencement exercises of the Birmingham Dental College were held in Seal's Music Hall, Birmingham, Ala., on Wednesday evening, March 7, 1894.

The address to the graduating class was delivered by Capt. W. C. Ward, and the valedictory address by D. C. Cosby, D.D.S.

The number of matriculates for the session was twenty-seven.

The degree of D.D.S. was conferred on the following graduates by T. M. Allen, D.D.S., dean: Drury C. Cosby, John H. Rice, and William P. Stinson, all of Alabama.

UNIVERSITY OF MARYLAND—DEPARTMENT OF DENTAL SURGERY.

THE annual commencement exercises of the Department of Dental Surgery of the University of Maryland were held at the Lyceum Theater, Baltimore, Md., on Friday, March 30, 1894.

The mandamus was read by the dean, Professor Ferdinand J. S. Gorgas, M.D., D.D.S.; the address to the graduates was delivered by Rev. Dr. L. T. Townsend, and the class oration by C. Chandler George, D.D.S

The number of matriculates for the session was one hundred and forty-five

The degree of D.D.S. was conferred on the following graduates by Hon. S. Teackle Wallis, LL.D., provost of the university:

NAME.	STATE.	NAME.	STATE.
Frank E. Blakeslee	New York.	William P. Lacy	Virginia.
Wm. M. H. Burfeind	California.	William S. Lindsay	South Carolina.
James C. Chisholm	Alabama.	Harter W. March	Ohio.
Henry Clay Daniel	North Carolina.	Charles A. Matthews	Indiana.
Harry M. Dommett	New York.	Jas. T. Montgomery	South Carolina.
Charles Aug. Davis	Wisconsin.	Redorick Morgan	North Carolina.
S. D. Diffenderfer	Pennsylvania.	L. B. Milbourne	Maryland.
Thomas Dotterer	South Carolina.	James A. Proctor	Virginia.
Baylis D. Earle	South Carolina.	William H. Renoe	Missouri.
Milton S. Fleming	Louisiana.	Clarence P. Reynolds	New York.
H. Eugene Gee	South Carolina.	C. Charles Stanley	South Carolina.
C. Chandler George	Illinois.	Norman R. Smithers	Maryland.
Edward H. Goldberg	Maryland.	Fred. B. Smith	Pennsylvania.
William J. Hartnett	Connecticut.	Richard C. Walden	Virginia.
J. E. M. Heffelbower	Texas.	John E. Walton	Georgia.
Phineas E. Horton	North Carolina.	James Watson	Illinois.
A. H. Huffman	West Virginia.	J. Brenton Wise	South Carolina.

AMERICAN COLLEGE OF DENTAL SURGERY.

THE eighth annual commencement exercises of the American College of Dental Surgery were held at the Grand Opera House, Chicago, Ill., on Monday, April 2, 1894, at 2.30 P.M.

The faculty address was delivered by Professor Edward H. Angle, and the valedictory by Alice Menges, D.D.S.

The number of matriculates for the session was two hundred and forty-eight.

The degree of D.D.S. was conferred on the following graduates by Dr. B. J. Cigrand, president of the board of directors:

E. D. Allison.
E. Aiston.
E. H. Bulson.
L. A. Beyer.
C. W. Barlow.
C. W. Blackburn.
Alden Carpenter.
L. A. Colestock.
D. H. Davis.
F. E. Downs.
C. L. Eberts.
Peter Frey.
E. B. Griffin.
S. A. Henry.
Ida N. Harter.
A. G. Hayden.
L. A. Kelley.
E. L. Ketchem.
I. B. Locke.
F. Leggo.
S. E. Lane.
Alice Menges.
A. H. Murdow.
J. F. Mensel.
G. W. Menges.
W. J. Morgan.
J. C. Monzon.
J. C. McDermott.
C. E. Neptune.
B. F. Nichols.
J. T. Perrault.
F. E. Roach.
E. A. Randall.
C. Scheer.
D. E. Smith.
T. M. Smith.
J. Senty.
F. Senty.
H. S. Stevenson.
W. R. Toye.
J. D. Van Vleck.
D. M. Willard.
G. W. Wyatt.

OHIO COLLEGE OF DENTAL SURGERY.

THE forty-eighth annual commencement exercises of the Ohio College of Dental Surgery (Department of Dentistry of the University of Cincinnati) were held at the Odeon, Cincinnati, Ohio, on Tuesday evening, March 27, 1894.

The annual address was delivered by Dr. John W. Simpson, of Marietta College, and the class oration by William C. Elifritz, D.D.S.

The number of matriculates for the session was one hundred and fifty-one.

The degree of D.D.S. was conferred on the following graduates by F. A. Hunter, D.D.S., of the board of trustees:

NAME.	STATE.
Charles V. Alsop	Kentucky.
John A. Auld	Michigan.
Edward G. Barnett	Ohio.
Charles F. Bauer	Ohio.
Fred. W. Brammer	Ohio.
Daniel H. Collette	Ohio.
Samuel R. Collier	Kentucky.
Frank R. Cunningham	California.
Will De Zoete	Michigan.
William C. Elifritz	Ohio.
Wm. A. Gregg	Ohio.
Charles L. Guthrie	Ohio.
Horace G. Hamilton	Ohio.
George R. Jenkins	West Virginia.
C. F. Lauderdale	Ohio.
Lewis E. Le Page	Ohio.
William F. Lohaas	Ohio.
Josiah Mann	New York.
Austin F. Merrell	Maine.
William F. Peebles	Ohio.
Guy B. Saxton	Kansas.
Herman Schwartz	Ohio.
John M. Scott	Ohio.
David A. Smith	Ohio.
Richard Storey	Minnesota.
William J. Sullivan	Indiana.
Edward M. Talbot	Iowa.
Arthur L. Teeters	Ohio.
Henry C Taylor	Ohio.
L. P. Vandervoort	Ohio.
Thaddeus S. Ward	Ohio.
Will L. Whipple	Minnesota.
T. Irving Way	Ohio.
Herman H. Zumstein	Ohio.

INDIANA DENTAL COLLEGE.

THE fifteenth annual commencement exercises of the Indiana Dental College were held at the Y. M. C. A. Hall, Indianapolis, Ind., on Friday evening, March 23, 1894.

The number of matriculates for the session was one hundred and four.

The degree of D.D.S. was conferred on the following graduates :

NAME.	STATE.	NAME.	STATE
A. E. Boyce	Illinois.	Maud Neff	Indiana.
De Volney Bower	Indiana.	D. H. Oliver, Jr.	Indiana.
L. W. Dailey	Indiana.	T. W. Potter	Indiana.
J. D. Gage	South Dakota.	R. J. Russell	Indiana.
L. Gonzales	Indiana.	S. N. Sellers	Indiana.
D. A. House	Ohio.	W. L. Spates	California.
F. M. Hindman	Illinois.	J. D. Seibert	Michigan.
A. F. Hubbard	Ohio.	G. J. Staggs	Indiana.
W. E. Hutchinson	Indiana.	F. C. Todd	Indiana.
F. A. Lange	Indiana.	I. M. Whittenburg	Illinois.
Nannie Margason	Illinois.	Charles Whitted	Indiana.
P. R. McNeille	New York.		

NATIONAL UNIVERSITY—DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the National University were held at Metzerott's Music Hall, Washington, D. C., on Tuesday evening, May 15, 1894, in connection with those of the Medical Department.

The address to the graduating classes was delivered by Professor George C. Ober, M.D., and the valedictory address by J. Edwin Waterbury, D.D.S.

The number of matriculates for the session was twenty-eight.

The degree of D.D.S. was conferred on the following graduates by Hon. Arthur MacArthur, LL.D., chancellor of the university :

NAME.	STATE.	NAME.	STATE.
Barney Babcock	New York.	John A. McAfee	Texas.
Ransom L. Caton	Alabama.	George B. Reeves	Illinois.
William C. Cannon	Illinois.	Walter F. Schricker	Missouri.
Frederick F. Daly	Dist. of Col.	J. Edwin Waterbury	California.

UNIVERSITY OF DENVER—DENTAL DEPARTMENT.

THE annual commencement exercises of the Dental Department of the University of Denver were held (in connection with those of the Medical Department) at the Trinity M. E. Church, Denver, Colorado, on Tuesday evening, April 17, 1894.

An address was delivered on behalf of the Dental Department by Professor J. M. Norman, and a general address by Rev. Robert McIntyre.

The number of matriculates for the session was eighteen.

The degree of D.D.S. was conferred on the following graduates in dentistry by Chanceller McDowell : Arthur W. Saner, Orlando W. Brown, and Herschel D. Raub, all of Colorado.

DENTAL SOCIETY ANNOUNCEMENTS.

AMERICAN DENTAL SOCIETY OF EUROPE.

THE American Dental Society of Europe will hold its nineteenth meeting at Geneva, Switzerland, August 6, 7, and 8, 1894. Last year this annual gathering was omitted, as many members wished to attend the Columbian Dental Congress. American colleagues who may be taking a summer vacation abroad are cordially urged to combine with their plans for travel and sight-seeing a visit to their professional brethren in Europe, and to join in the various exercises of the occasion. Members of the profession everywhere will be welcome. Programs may be had on application to the president, Dr. L. C. Bryan, of Basel, or to the undersigned.

CHAS. W. JENKINS, *Secretary*,
1 Sonnenquai, Zürich, Switzerland.

INDIANA STATE DENTAL ASSOCIATION.

THE Indiana State Dental Association will meet Tuesday, June 26, 1894, at Lake Maxinkuckee, Ind. The session will be three days long. All are invited to attend. The State Board of Dental Examiners will convene at the same time and place.

G. E. HUNT, *Secretary*.

PENNSYLVANIA STATE DENTAL EXAMINING BOARD.

THE Pennsylvania State Dental Examining Board will meet for the transaction of business at Cresson, Pa., commencing on Tuesday, July 10, 1894.

W. E. MAGILL, *President*, Erie, Pa.
J. C. GREEN, *Secretary*, West Chester, Pa.

NEW HAMPSHIRE STATE BOARD OF REGISTRATION IN DENTISTRY.

THE New Hampshire Board of Registration in Dentistry will meet in Concord, June 26 and 27, 1894. All persons intending to appear before said board should apply to the secretary as soon as possible.

EDWARD B. DAVIS, D.D.S., *Secretary*,
Concord, N. H.

SOCIETY OF THE ALUMNI, UNIVERSITY OF PENNSYLVANIA.

THE annual reunion of the Society of the Alumni, Department of Dentistry, University of Pennsylvania, will be held at the Colonnade Hotel, Philadelphia, on Wednesday, June 6, 1894.

The regular business meeting at 2 o'clock P.M., followed by essays as follows: "To what Degree should a Dentist be Conservative?" Edward H. Allen, Freeport, Ill.; "The Physiology of Hypnotism," A. H. Porter, Philadelphia; Annual Oration, R. H. Seymour, Philadelphia.

The annual dinner at 7 o'clock.

MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

A MEETING of the Massachusetts Board of Registration in Dentistry will be held in Boston, Tuesday, June 12, 1894, at the United States Hotel, at 10 A.M., for the examination of candidates. Application should be made at once to the secretary, E. V. McLEOD, New Bedford, Mass.

CONNECTICUT VALLEY DENTAL SOCIETY.

THE thirty-first annual meeting of the Connecticut Valley Dental Society will be held at Holyoke, Mass., June 20, 21, and 22, 1894. A cordial invitation to be present is extended to members of dental societies.

GEORGE A. MAXFIELD, D.D.S., *Secretary.*

EDITORIAL.

THE ORAL MANIFESTATIONS OF LITHEMIA.

FOR a number of years the coincidence of dental erosion and of pyorrhea alveolaris with gouty and rheumatic conditions has been noted from time to time by various observers, and the causal relation of the latter to the former has been suspected though not fully made out. The announcement by Peirce of the existence of uric acid and its compounds as a constituent of the concretions upon the roots of teeth in pyorrhea cases constituted a positive and valuable addition to the etiology of that disorder, and has done much to relieve it of its former obscurity. As with all new discoveries, the announcement of the probable gouty origin of pyorrhea has met with opposition, and in some cases it has been practically discredited. The opponents of the theory are, however, mainly those who hold to the belief that pyorrhea is exclusively a local disease. There are, besides these, a number who reject the uric-acid theory, while asserting that the disease is both constitutional and local; yet they do not advance a suggestion as to the possible character of the constitutional cause of it.

Perhaps the most important reason for the objections noted is the failure to recognize that the condition presented by a case calling for treatment by the dentist, with the typical manifestations of looseness of the teeth, pus flowing from pockets about the teeth, and with the characteristic concretions upon the roots, represents a much advanced stage of the disorder, and one which, so far as the most evident symptoms are concerned, is practically a local disorder. We know, however, that the most thorough local treatment will wholly fail to prevent its recurrence, notwithstanding the most skillful efforts in that direction. The theory that it is local in its origin will not successfully account for this tendency of the disease to recur, therefore to assign to it a primary constitutional origin is justifiable on *a priori* grounds alone.

The lithemia theory has received further support recently through the discovery of two important facts. It has been shown that deposits of uric acid and its salts can and do take place in the pericemental ligament and upon the root before any break in the attachment of the tissues at the gingival margin occurs. This fact establishes beyond any question that the origin of the deposit is not salivary, but from the blood. The facts of its origin and its composition having been thus determined with reasonable accuracy, the theory of its purely local origin is found to be an insufficient explanation of the etiology of the disorder. Whether we are to accept or not the statement that pyorrhea is an expression of the gouty diathesis, depends largely upon our concept of what the gouty diathesis is. If Garrod's definition is accepted, that gout is due to the existence of uric acid in the blood, then there can be no reasonable ground, in view of what we now know of at least the most characteristic form of pyorrhea, for not classifying it as an expression of that constitutional disorder.

Whether we are ready to accept the definition or not, the facts have been sufficiently established to warrant a most careful study of therapeutic possibilities along the lines indicated. Several reports have been made where the results of a carefully applied anti-gout treatment in pyorrhea cases have produced results of the most satisfactory, not to say astonishing, character. The constitutional treatment must of course be conjoined with, or follow, thorough local treatment for the removal of all deposits within reach of instrumentation. The mistaken idea has in some measure arisen that constitutional treatment was expected to bring about removal of the deposits upon the root by their resorption through the blood-current. If the deposits were within reach of the blood-current, as they perhaps are before a break takes place in the gingival attachment, and when they exist only in the pericemental ligament, resorption could, and under proper treatment, probably does, take place. After necrosis of the ligament with formation of a pus-pocket has occurred, the deposit becomes simply an irritant foreign body, which, though in contact with the tissues, is as much out of reach of the blood-current as a splinter of wood in the flesh would be.

In the therapeutic treatment of gout the salts of lithium have held a most important place. While opinions are divided as to their efficacy, and especially in regard to the relative value of the many lithium preparations now in use, the weight of evidence seems to be strongly in their favor. The value of the lithium salts is believed to depend upon the fact that they form soluble combinations with uric acid, and thus assist in its elimination. In seeking for some agent which might be used systemically to bring about an alkaline reaction of the mucus secreted by the labial mucous glands in erosion cases, the potassium bitartrate was suggested, because of its well-known power to produce an alkaline impress upon the secretions, especially of the urine, when given in small, repeated doses. The therapeutic test was made with only temporarily good results, as the acidity of the mucous secretion returned soon after cessation of the treatment. The coincidence of erosion with lithemic conditions suggested the propriety of administering a lithium salt in these cases, in order to secure the alkaline impress in connection with the lithium effect ; in other words, to produce an alkaline and solvent effect which should be measured in terms of lithium instead of potassium. To meet these conditions the lithium bitartrate was made. This salt is the chemical analogue of common cream of tartar, and may be designated as lithium cream of tartar. In general appearance and physical properties it is indistinguishable from that well-known compound. Given in doses of twenty grains per diem, divided in five-grain tablets taken four hours apart, each dose in a half-pint of water, the effect is prompt and thorough. With any of the other lithium salts so far tried an interval of a week or ten days is required before any definite result is manifested. With the bitartrate the reaction is seen within twenty-four hours, and a general improvement is manifest in the systemic disturbances which are almost invariably present in connection with the oral disorders under consideration. It may be asked, What advantage can the tartrate have over the citrate of lithium, both being salts of closely related organic acids which both have to be gotten rid of by oxidization in the circulation? To this no theoretical answer can perhaps be given. It is simply a result of clinical test in a goodly number of cases that the bitartrate is beyond all comparison the more active and efficacious of the two.

The use of lithium bitartrate in erosion cases is in the purely experimental stage, and is being given solely in the hope that a permanent alteration may be made in the reaction of the labial mucus. Nothing has so far been brought forward to connect this disorder with lithemia other than the frequently observed coincidence of erosion with gouty and rheumatic states. The nature of the acid which produces the solvent action upon the teeth has not been studied. It is hardly supposable that uric acid is the solvent in the case, as uric acid is a very weak and practically insoluble acid, especially in acid menstrua. It does not seem improbable, however, from what we know of the irritating effects of uric acid and its salts when deposited in the tissues, that if deposited in the texture of, or in contact with, the labial mucous glands, it might by its irritant action bring about an alteration of function of the gland which would cause it to secrete an acid mucus the acidity of which would be due to some other substance than uric acid,—the acid sodium phosphate, for example. The connection of erosion and lithemia is not altogether conjectural; their frequently observed association is certainly not wholly a coincidence, and the existence of true gouty pyorrhea with typical erosion in the same mouth is an established fact. Hence a common origin for these two disorders may be strongly suspected.

AMERICAN DENTAL COMPETITION.

THE following expression of opinion from an English contemporary is of interest for the reason that it possibly exhibits correctly the animus of the recent protective legislation by the General Medical Council of England. We are not informed as to the opinions of English dentists on the matter, but so far as those of America are concerned there is a widespread belief that the reason given by the *Medical Press* is the milk of the cocoanut:

> "The *Medical Press* has awakened to the fact that the General Medical Council is 'making itself the servant of the British Dental Association,' especially in regard to the refusal to register American dental diplomas. This course was taken, as was pointed out in *The Chemist and Druggist* months ago, because the American universities have notions lower than the General Medical Council in regard to preliminary education. Our contemporary advances another reason,—viz, that 'the British Dental Association has found the professional competition of the American registered dentists to be inconvenient, and it has put pressure upon the General Medical Council of sufficient force to secure the disfranchisement of all foreign dentists and the abrogation of the powers of the Council in respect of foreign registration.' There may be something in this. What do the dentists say to the charge?"

The *British Journal of Dental Science*, in its issue of May 1, expresses the following views:

> "Although somewhat late in the day, the *Medical Press* utters a protest against the action of the General Medical Council in suspending the registration of foreign diplomas. We do not agree with our contemporary that the reason some English dentists were in favor of the council's action arose from the inconvenience of professional competition of Americans. We have always thought that the memorial to the council was signed by dentists who represented the hospitals, schools, and students. It was pointed out that a home-grown student might be tempted to leave the present British curriculum, escape his examination in preliminary education, and get a foreign dental diploma entitling him to register before his stay-at-home brother had completed his five-years' training. The *Medical Press* does not seem very well acquainted with all the circumstances under which the Dentists' Act was passed. However, it thinks that a very dangerous precedent for action by the council has been created, 'which, if we permitted it to remain unchallenged, might be used in other directions at a future time.' Perhaps the latter words may somehow explain this expression of opinion."

BIBLIOGRAPHICAL.

THE ETIOLOGY OF OSSEOUS DEFORMITIES OF THE HEAD, FACE, JAWS, AND TEETH. By EUGENE S. TALBOT, M.D., D.D.S. Third edition, revised and enlarged. 8vo, pp. 487, with 461 illustrations. Chicago: The W. T. Keener Company, 1894.

This is a volume which is justly to be viewed as an important contribution to dental literature, and written in such a manner as to serve as the basis for further work of investigators who follow the author. As the book is beyond doubt destined to occupy a prominent place in the literature of teratology, criticisms will not end with the various reviews, but will be made by each observing reader which the volume will have. The number of readers, it may be said parenthetically, the work should have is the exact number of students in dentistry or anatomy.

A work of less importance might be passed over with a casual notice, but a book of this type is justly entitled to an extensive analysis and criticism, which, if made of a lighter volume, would be termed captious. A sufficient review of this work would form a small book in itself; hence we can only devote space to certain of its most striking features.

Every page gives evidence of wide and applicable reading. The author has drawn upon all literature and many museums for materials, and added to this we have the results of his evidently extensive observation and careful research.

The list of references in anthropology, ethnology, teratology, etc., is a long and well-selected one.

In all books which deal with subjects relating to biology, the reader almost instinctively looks for some phase of the doctrine of evolution. This is no exception. It is written professedly from the evolutionist's point of view, and manifests consistently throughout that basis of reasoning.

We are accustomed to referring to such authors as Spencer, Tylor, Sir Henry Mains, and John Fiske for all coherent reasoning relating to the doctrines of evolution. Compared with the literary and scientific horizon furnished by such men, that represented by this book is a little narrow. This may or may not be of moment, depending upon the deductions which rest upon certain data. As an instance of this, Dr. Talbot views the causes of the American revolution as the environment of the Puritans in New England: "The struggle for existence, the peculiar environment produced by the type of man brought about the downfall of one-man rule among the Anglo-Saxon people."

Contrast this with the reasoning of Fiske, who finds "that the seeds of the movement were planted by Simon Montfort. From these grew a plant which, blossoming from time to time, burst into full flower as the American Revolution."

The parts directly relating to the broad aspect of anthropology have a slightly contracted compass when measured by the same standards, with, in places, an undercurrent of inaccuracy of statement and reasoning. Viewed solely as a piece of literature, the book is susceptible of improvement. Subsequent editions will no doubt have generalizations better defined, and more of them.

The good things, the virtues, come last, and are present in quantity sufficient to have all readers congratulate the author and themselves that they have so excellent a work.

Written as the book is in a thoroughly scientific spirit, there do not appear to be any trustworthy data which the author has neglected, and no really important matter which he has not treated. The view universally held that heredity plays a prominent part in malformations is worked out at length. Regarding deformities of facial bones, Dr. Talbot demonstrates their frequent association with defects of structure which lead to psychical disorders, showing how in many cases these congenitally malformed or pathologically acting cerebri are one phase of a disturbed nutritive action, which produces also the facial deformity.

The lists of cases presented as evidence of the directing influence of the nervous system over structural peculiarities have convincing weight and are of permanent value.

The reactions of function upon structure and of structure upon function are carried as far as the present state of biological science warrants. This section will no doubt receive additions and modifications in future editions. The great importance of this particular section entitles it to be carefully studied by every one.

In dealing specifically with dental irregularities, the author treats the matter systematically and carefully, and selects cases which serve well to elucidate the views enunciated. This section is full and well treated. The work, as the title states, deals alone with etiology; the question of orthodontia is not discussed.

As it is, the book is the most satisfactory and most scientific work within our knowledge upon the subjects treated.

Dentists are frequently and with injustice charged with an inaccuracy of observation and carelessness of statement. It is gratifying to find in this volume praiseworthy observations which are credited to dental practitioners. The author is to be felicitated in that he has found in the dental profession such a number of men who enter heartily into the pursuit of a purely scientific subject.

THE TANNINS. A Monograph on the History, Preparation, Properties, Methods of Estimation, and Uses of the Vegetable Astringents, with an Index to the Literature of the Subject. By HENRY TRIMBLE, Ph.M., Professor of Analytical Chemistry in the Philadelphia College of Pharmacy. Volume II. Philadelphia: J. B. Lippincott Company, 1894.

This book embodies the results of a masterly and exhaustive research into the nature and properties of the astringent principles contained in nine species of oaks and one species each of mangrove, canaigre, and chestnut. The sources, history, preparation and purification, properties and composition, and methods of quantitative estimation are in each case fully discussed and described. A most important and satisfactory feature of the volume is the copious bibliography appended, which embraces a total of nearly one thousand titles. The work is the most important one in the literature of the subject.

PAMPHLETS RECEIVED.

Transactions of the Dental Society of the State of New York. Twenty-fourth and Twenty-fifth Annual Meetings, Albany, N. Y., May, 1892–1893.

Transactions of the Iowa State Dental Society at the Thirtieth Annual Meeting, held at Davenport, May 9 to 12, 1893. Chicago: The Dental Review Co., 1893.

Transactions of the New Jersey State Dental Society, at West End Hotel, Asbury Park, N. J., July 19, 20, and 21, 1893. Philadelphia: The S. S. White Dental Manufacturing Company, 1894.

Die Extraction der Zähne, für Ärzte und Studirende. (The Extraction of the Teeth, for Practitioners and Students.) By Professor Dr. Med. L. Hollaender. Fourth new and revised edition. With 54 illustrations. Leipzig: Arthur Felix, 1894.

Transactions of the College of Physicians of Philadelphia. Third Series. Vol. XV. Philadelphia, 1893.

A Partial System of Dental Nomenclature adopted by the Faculty of Northwestern University Dental School. 1894.

A Lesson in Altruism. Delivered at the Graduating Exercises of the Kansas City Dental College, March 5, 1894. By A. H. Thompson, D.D.S., Topeka, Kansas.

Second Annual Report of the Woman's Dental Association, and Minutes of the National Meeting held in Chicago, August 18, 1893.

The Alumni Annual. 1894. Issued by and devoted to the interests of the Society of the Alumni, Department of Dentistry, University of Pennsylvania.

OBITUARY.

DR E. W. HART.

Died, at West Gardner, Mass., March 1, 1894, of Bright's disease and heart-failure, Dr. E. W. Hart.

Dr. Hart was born at Pomfret, Vt. He studied dentistry with Dr. L. F. Tolman, of Athol, Mass., and entered practice at Orange about twelve years ago, but for several years had been in successful practice at West Gardner, up to the time of his decease.

Dr. Hart married Miss Annie Spaulding, of Woodstock, Vt., who survives him with two children.

DR. WILLIAM A. HOWE.

Died, at Hamilton, Bermuda, January 31, 1894, of congestion of the lungs followed by heart-failure, Dr. William A. Howe, in the twenty-eighth year of his age.

Dr. Howe was born at Meaford, County Grey, Ontario, Canada, October 18, 1866. He commenced the study of dentistry in January, 1891, with Dr. R. B. Burt, of Collingwood, and subsequently entered practice at Thornbury, Ontario, at which place he was married, December 5, 1893, to Miss Bertha Young, who survives him.

Dr. Howe was a graduate of the Ontario College of Pharmacy, at Toronto, at which institution he won the prize of a silver medal. He was ambitious and energetic, but declining health caused him during the winter to go to Bermuda with the hope of relief. He did not improve, however, and died there on the date above given. His remains were brought home by his brother to Thornbury, and his funeral took place there on the 15th day of February last.

DR. GEORGE BOWERS.

Died, at Nashua, N. H., December 29, 1893, of rheumatism of the heart, George Bowers, D.D.S., in the sixty-third year of his age.

Dr. Bowers was born at Hancock, N. H., October 10, 1831. He commenced the study of dentistry in 1856 with Dr. Ball, of Nashua. After some itinerant practice in New Hampshire, at Nashua, Hancock, and Lempster, in 1862 he settled at Springfield, Vt. In 1877 he returned to Nashua, where he continued in practice up to the time of his decease.

Dr. Bowers was a graduate of the Philadelphia Dental College, class of 1865. He was a member of the Connecticut Valley and New Hampshire State Dental Societies.

In December, 1858, Dr. Bowers was married to Lourania C. Brackett, a teacher in the public schools of Holyoke, Mass. They had four children. Two died in early years, and one, Dr. Horace A. Bowers, who was his father's partner for several years, died two years ago. Dr. Bowers was held in much esteem as a good citizen, a warm friend, and a tender husband and father. He was a strong advocate of the temperance cause. The widow and one son, Dr. George A. Bowers, survive him.

DR. LORENZO A. VARNEY.

DIED, at Windsor, Vermont, April 28, 1894, of typhoid fever, DR. LORENZO ALLISON VARNEY, in the thirty-second year of his age.

Dr. Varney was born at Brompton, P. Q., October 7, 1862. He commenced the study of dentistry with Dr. H. E. Williams, of Windsor, Vermont, with whom he formed a partnership in 1888, after a course of lectures in the New York College of Dentistry. He was ambitious, and was recognized as a skillful dentist. He was a member of the Vermont State Dental Association, was a Mason, and an earnest and active member of the Congregational Church.

In 1890, Dr. Varney was married, in Rutland, Vt., to Miss Effie A. Perkins, and she and one daughter survive him. In the community he was regarded as a man of sterling integrity, and one who discharged with intelligence and fidelity every trust reposed in him. His early decease is much regretted by a large circle of relatives and friends.

DR. W. H. EAMES.

THE St. Louis Dental Society met on May 1, 1894, at the Missouri Dental College. During the meeting the following resolutions were adopted:

Resolved, That in the death of Dr. W. H. Eames this society has lost a valuable member; one deeply interested in the progress of his profession, and for years a prominent supporter and contributor to its leading journals. This society gratefully acknowledges his services in advancing its interests and preserving the high standard of dentistry. We extend our heartfelt sympathies to his bereaved family, and mourn with them the loss of a devoted husband and father, our brother, of whom it can be truly said that those who knew him best loved him best;

Resolved, That copies of these resolutions be furnished to the dental journals for publication, and a copy be sent to the bereaved family.

A. H. FULLER,
JOHN G. HARPER,
WM. N. MORRISON.

DENTAL LEGISLATION.

VIRGINIA'S AMENDED DENTAL LAW.

THE amended law of the State of Virginia regulating the practice of dentistry is printed below, having been approved March 2, 1894:

AN ACT *to amend and re-enact sections seventeen hundred and sixty-seven and seventeen hundred and seventy-four of the Code of Virginia as amended and re-enacted by an act entitled an act approved January twenty-eighth, eighteen hundred and ninety, entitled an act to amend and re-enact sections seventeen hundred and sixty-seven and seventeen hundred and seventy-four, of chapter seventy-nine, Code of Virginia, relating to the practice of dentistry.*

1. Be it enacted by the General Assembly of Virginia, that sections one thousand seven hundred and sixty-nine and one thousand seven hundred and seventy-two of the Code of Virginia, and also sections one thousand seven hundred and sixty-seven and one thousand seven hundred and seventy-four of said Code, as amended and re-enacted by an act entitled an act to amend and re-enact sections one thousand seven hundred and sixty-seven and one thousand seven hundred and seventy-four, of chapter seventy-nine, Code of

Virginia, relating to the practice of dentistry, be amended and re-enacted so as to read as follows :

SEC. 1767. From and after the passage of this act, it shall be unlawful for any person to engage in the practice of dentistry in the Commonwealth of Virginia, or to assist in the practice of dentistry as either assistant or employé, or to receive license from any commissioner of revenue, unless such person has graduated and received a diploma from the faculty of a reputable institution where this specialty is taught, and chartered under the authority of some one of the United States, recognized as of good repute by the board of examiners, duly appointed under the provisions of section one thousand seven hundred and sixty-eight of this chapter, and shall have obtained a certificate from said board of examiners as provided in section one thousand seven hundred and sixty-nine of said chapter ; provided, that persons who held license to practice dentistry in this Commonwealth on the twenty-eighth day of January, eighteen hundred and ninety, and have complied with the requirements of section one thousand seven hundred and seventy-four, shall be otherwise exempt from the provisions of this section ; and provided further, that nothing contained in this section shall prevent any authorized physician or surgeon, or other person, from extracting teeth for any one suffering from toothache.

SEC. 1769. It shall be the duty of this Board—

First. MEETINGS.—To meet annually at the time and place of meeting of the Virginia State Dental Association, or at such other time and place as the board shall agree upon, to conduct the examination of applicants. They shall also meet for the same purpose at the call of any four members of the board, at such time and place as may be designated by said members. Thirty days' notice of the meetings shall be given by advertising in at least two of the daily papers published in the state.

Second. EXAMINATION OF APPLICANTS, ETC.—To grant a certificate of ability to practice dentistry to all applicants who undergo a satisfactory examination, and receive at least four affirmative votes, which certificates shall be signed by the members of the board, and be stamped with a suitable seal (which they may adopt).

Third. REGISTRY.—To keep a book in which shall be registered the name and qualification (as far as practicable) of every person to whom such certificate is granted.

Fourth. TEMPORARY CERTIFICATES.—Any member of the board designated by the president thereof, may, upon presentation by any applicant of the evidence of the necessary qualifications to practice dentistry under this chapter, grant a temporary license to practice until the next meeting of the board, and no longer ; provided, that no such temporary license shall be granted to any person who has been rejected on an examination by the board. All such temporary licenses shall be signed by the secretary of the board.

SEC. 1772. Any person who shall in violation of this chapter practice dentistry in this state, shall, on conviction thereof, be fined not less than fifty, nor more than two hundred dollars, and shall not be entitled to any fee for services rendered, and if a fee shall have been paid, the patient may recover back the same. On the trial of any person charged with the violation of any of the provisions of this chapter, it shall be incumbent on the defendant to show that he has authority under the law to practice dentistry in this state in order to relieve himself from the penalties herein prescribed.

Any commissioner of the revenue who shall in violation of section seventeen hundred and sixty-seven issue a license to any person not authorized to practice dentistry by this chapter, shall, upon conviction thereof, be fined not less than twenty, nor more than fifty dollars, and no license issued by any commissioner in violation of this chapter shall be valid.

SEC. 1774. Every person practicing dentistry in the Commonwealth of Virginia at the time of the passage of this act, shall register his name and post-office address, together with the name of the college from which he is a graduate, or the length of time he has been practicing in this Commonwealth, with the board of examiners before renewing his license, and it shall be the duty of the board to issue to each person so registered, a certificate of registration, stamped with the seal of the board, but no fee shall be collected from persons so registering.

Every person holding a certificate of qualification or registration from the board of examiners at the time of the passage of this act, shall, within sixty days therefrom, have his certificate recorded in the clerk's office of the county or corporation court of every county or city in which he proposes to practice, and if in the city of Richmond, in the office of the clerk of the chancery court of said city, and every person who shall, after the passage of said act, obtain such certificate from the board, shall have said certificate recorded in the same manner within sixty days after receiving the same, and before receiving a license from any commissioner of the revenue.

The certificate shall be recorded in a book to be kept for the purpose, and properly indexed.

The clerk's fee for recording such a certificate shall be fifty cents.

This act shall be in force from its passage.

UTAH'S DENTAL LAW.

Following is the text of an act regulating the practice of dentistry in the territory of Utah, passed by the last legislature, and approved by the governor March 8, 1894:

Be it enacted by the Governor and Legislative Assembly of the Territory of Utah, as follows:

Section 1. It shall be unlawful for any person who is not at the time of the passage of this act engaged in the practice of dentistry in this territory, to practice dentistry therein unless he or she shall have obtained a certificate as hereinafter provided.

Sec. 2. A board of examiners, to consist of five practicing dentists, is hereby created, whose duty it shall be to carry out the purposes and enforce the provisions of this act. The members of said board shall be appointed by the governor, from the dental profession of the territory at large. The term for which the members of said board shall hold their offices shall be three years, except that two of the members of the board, first to be appointed under this act, shall hold their office for the term of two years, and three for the term of three years, respectively, and until their successors shall be duly appointed and qualified. In case of a vacancy occurring in said board, such vacancy shall be filled by the governor in conformity with this section.

Sec. 3. Said board shall choose one of its members president and one the secretary thereof, and it shall meet at least once in each year, and as much oftener and at such times and places as it may deem necessary. A majority of said board shall at all times constitute a quorum, and the proceedings thereof shall at all reasonable times be open to public inspection.

Sec. 4. Within six months from the time that this act takes effect it shall be the duty of every person who is now engaged in the practice of dentistry in this territory to cause his or her name and residence or place of business to be registered with said board of examiners, who shall keep a book for that purpose. The statement of every such person shall be verified under oath before a notary public or justice of the peace in such manner as may be prescribed by the board of examiners. Every person who shall so register with said board as a practitioner of dentistry shall receive a certificate to that effect, and may continue to practice as such without incurring any of the liabilities or penalties provided in this act, and shall pay to the board of examiners for such registration a fee of one dollar. It shall be the duty of the board of examiners to forward to the county clerk of each county in the territory a certified list of the names of all persons residing in his county who have registered in accordance with the provisions of this act, and it shall be the duty of all county clerks to register such names in a book to be kept for that purpose.

Sec. 5. Any and all persons who shall so desire may appear before said board at any of its regular meetings, and be examined with reference to their knowledge and skill in dental surgery; and if the examination of any such person or persons shall prove satisfactory to said board, the board of examiners shall issue to such persons as they shall find to possess the requisite qualifications a certificate to that effect, in accordance with the provisions of this act. Said board shall also indorse as satisfactory diplomas from any reputable dental college recognized by the National Association of Dental Examiners, upon the holder furnishing evidence satisfactory to the board of his or her right to the same, and shall issue certificates to that effect within ten days thereafter. All certificates issued by said board shall be signed by its officers, and such certificates shall be prima facie evidence of the right of the holder to practice dentistry in the territory of Utah. One member of said board may grant a license to an applicant to practice until the next regular meeting of the board, when he shall report the fact, at which time the temporary license shall expire; but such temporary license shall not be granted by a member of the board after the board has rejected the applicant.

SEC. 6. Any person who shall violate any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction may be fined not less than fifty dollars nor more than two hundred dollars, or be imprisoned in the county jail not less than one month nor more than three months, or by both such fine and imprisonment for each and every offense. All fines recovered under this act shall be paid into the common-school fund of the county in which such conviction takes place.

SEC. 7. In order to provide the means for carrying out and maintaining the provisions of this act, the said board of examiners shall charge each person applying to or appearing before them for a certificate of qualification the sum of ten dollars, which fee shall in no case be returned; and out of the funds coming into possession of the board from the fees so charged and penalties received under the provisions of this act all legitimate and necessary expenses incurred in attending the meetings of said board shall be paid, and no part of the expenses of the board shall be paid out of the territorial treasury. All moneys received in excess of expenses above provided for shall be held by the secretary of said board as a special fund for meeting the expenses of said board and carrying out the provisions of this act. he giving such bonds as the board shall from time to time direct. And said board shall make an annual report of its proceedings to the governor by the first of December of each year, together with an account of all moneys received and disbursed by them pursuant to this act.

SEC. 8. Any person who shall receive a certificate from said board to practice dentistry shall cause his or her certificate to be registered with the county clerk of the county in which such person may reside, and the county clerk shall charge for registering such certificate a fee of one dollar. Any failure, neglect, or refusal on the part of any person holding such certificate to register the same with the county clerk as above directed for a period of six months shall work a forfeiture of the certificate; and no certificate, when once forfeited, shall be restored, except upon the payment to the said board of examiners of the sum of twenty-five dollars as a penalty for such neglect, failure, or refusal.

SEC. 9. Any person who shall knowingly and falsely claim or pretend to have or hold a certificate of license, diploma, or degree granted by any society organized under and pursuant to the provisions of this act, or who shall falsely and with intent to deceive the public claim or pretend to be a graduate from any incorporated dental college, shall be deemed guilty of a misdemeanor, and shall be liable to the same penalty as provided in Section 6.

SEC. 10. Nothing in this act shall be so construed as to prohibit any one from extracting teeth.

SEC. 11. This act shall take effect and be in force from and after its approval by the governor.

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PERISCOPE.

THE COMMERCIAL FORMS OF HYDROGEN DIOXID.—About two years ago (*The Medical News*, April 9, 1892) a note was published by Dr. Beam and myself on the analysis of some samples of hydrogen dioxid, the brands selected being such as were in common use. The figures showed that considerable difference existed between the articles, and that some brands were decidedly inferior, both as to strength and purity. Similar investigations have been reported by others. Thus Dr. Smith, of the Yale Medical School, published in the *New York Medical Journal* of August 6, 1892, a table of analyses of many samples purchased in small amounts at retailing drug-stores. The maker's name was obtained when possible. These analyses showed much variation in quality, but the manufacturers may not be responsible for all the deficiencies observed. Some samples were found to contain no hydrogen dioxid, and others very little. The same issue of the *Journal* contains a paper by Dr. Squibb, discussing the method of assay, and giving the results of examinations of some much-used brands as sent out by the makers. Dr. Squibb gives figures only for the strength in available oxygen, but he states that several brands contain much more free acid than is either necessary or permissible. In the last number of *The Ephemeris* (January, 1894), Dr. Squibb details an elaborate study of the preparation and properties of the dioxid, but the information concerns the chemist and pharmacist rather than the physician. The papers of Drs. Smith and Squibb confirm, as far as they cover the same ground, the figures given by Dr. Beam and myself. It has seemed advisable to repeat the analytic tests, to determine if any perceptible improvement in the quality of the commercial articles has followed the publication of the analytic reports.

Incidental to the discussion of this subject, it has been shown by Dr. Squibb that a process for the assay of hydrogen dioxid, furnished by Mr. Marchand, and adopted by many, gives erroneous results, exaggerating materially the value of the sample tested. Correct methods of assay show that no solution is ordinarily obtainable in the market of higher strength than twelve volumes, and that many do not equal this. When properly prepared, these solutions are not nearly so liable to decomposition as was formerly supposed. They keep for some time in a moderately cool place, and will bear gentle heating without serious loss. Many of the samples herewith noted were kept in my laboratory for several weeks at a point where the temperature was in the neighborhood of 70° F., the corks being not very tightly inserted, and a second determination was then made, the results of which are given in the table appended. It will be seen that there has been little loss, and, indeed, slight concentration has occurred in a few cases. This has been noted by others, and is due to the fact that hydrogen dioxid is less volatile than water.

One of the points indicated by the results is that reputable manufacturers should cease claiming a strength of fifteen volumes. The use of these figures may have been originally due to the employment of the erroneous method of assay noted, but there is now no justification for continuing the error, as the United States Pharmacopeia gives a correct process. On the other hand, there does not appear to be any reason that the article should be sold to the trade without some indication of strength. Many samples were found to be sufficiently decomposed when purchased, even when sent directly from the place of manufacture, to produce marked explosions when the corks were loosened. This must be considered an unfavorable point, as a good eleven-volume solution may be made that will not be so easily decomposed.

Some interest attaches to the amount and general nature of the impurities present, and determinations of a few of these have been made. It is not possible, at least not commercially practicable, to make a solution consisting of water and hydrogen dioxid only, and the material will not keep without a trace of acid. The acid is usually either sulfuric, hydrochloric, or phosphoric, and according to the standard of the United States Pharmacopeia it is required that barium shall not be present. Squibb asserts in the article in *The Ephemeris* that barium is highly objectionable, though I am not able to see how a small quantity can do harm. Only one sample of all examined by me gave a reaction for barium, and a quantitative determination showed that this sample contained thirty-five milligrams (about half a grain) to the liter. I cannot regard this amount as objectionable in any way. The sodium-hydroxid solution used was a little weaker than decinormal.

The following table shows some very interesting points. In the first place, it is not surprising that satisfactory results are sometimes not attained with the agent. The poor quality of Nos. 5 and 6, both from the same manufacturer, but obtained through different wholesalers, is especially noticeable. The specimens are little else than dilute sulfuric acid. Nos. 15, 16, and 17 are accompanied by a circular claiming great purity and strength, and especially claiming only a trace of fixed residue; yet it is seen that the residue is the highest of the series. These samples were all from the stock of a large general hospital, to which they were furnished by the makers as specimens.

It is hardly necessary to point out the other details of the table, but as an evidence of what can be accomplished I would like to call attention to the low acidity of Nos. 1 and 21, which show full strength and excellent keeping qualities.

The analytic investigation shows, therefore, that while there are several excellent brands of hydrogen dioxid on the market, there is still a great deal of inferior material, and that the reputation of a manufacturer is no assurance of quality. When it is considered that the assay of this material is easy, and its stability, when properly made, is satisfactory, it seems that the physicians and pharmacists have a right to require that at least a ten-volume solution, containing only a small amount of acid and of solid matter, shall be furnished. Moreover, there is no excuse for a druggist's dispensing a weak preparation.

BRAND.	Volumes of oxygen.		C.C. of NaHO for 50 c.c.	Residue from 50 c.c.	Pressure on opening bottle.	Response to test for	
	1st test.	2d test.				Sulfates.	Chlorids.
1. Oakland Chemical Company	11.0	11.2	4.5	0.028	None.	None.*	Marked.
2. Béné	9.9	9.8	10.0	0.106	Moderate.	Marked.	Slight.
3. Marchand	8.3	8.5	10.5	6.034	Strong.	Slight.	Marked.
4. "	7.5	......	7.0				
5. Merck	1.1	......	27.0	0.164	Moderate.	Marked.	Slight.
6. "	1.6	1.5	26.0	0.116	Strong.	"	"
7. Powers & Weightman	9.6	9.5	6.5	0.089	Moderate.	"	"
8. " "	......	9.6	7.0	.....	Strong.		
9. " "	9.7	9.7	7.0	......	Moderate.		
10. " "	......	10.2	7.5	......	"		
11. Rosengarten & Sons	6.7	6.6	2.4	0.030	None.	None.	Slight.
12. " "	......	6 2	5.8	0.026	"		
13. " "	......	7.1	4.0				
14. Lehn & Fink	3.7	3.6	19.0	0.120	Marked.	Slight.	Marked.
15. Pouchet	8.0	8.0	7.0	0.363	Strong.	"	"
16. "	......	8.2	8.0	......	"		
17. "	......	8.8	8.5	0.358	"		
18. Squibb & Son	11.1	10.8	10.5	0.111	Very slight.	Slight.	Marked.
19. Drevet	8.2	7.6	7.5	0.059	" "	"	"
20. Smith-Klein-French Company	7.5	7.3	20.5	0.108	None.	Marked.	"
21. McKesson & Robbins	......	10.0	2.2	0.031	"	Slight.	None.

* Contains thirty-five milligrams of barium per liter.

He can exercise, with but little trouble, a control over his purchases of hydrogen dioxid, and a bottle once tested (only 1 c.c. is required for a test) can be kept so that very little loss of strength occurs during a reasonable time. Actual trial by prescriptions at two drug-stores, one in the center of the city and the other in the northeast section, resulted in obtaining very satisfactory samples, each showing nearly eleven volumes.

Some very poor samples, in one-ounce bottles, have been obtained from special supply houses (not dealers in drugs), but the data in regard to these will be published elsewhere.

Solution of hydrogen dioxid may be concentrated upon a water-bath to a strength of fifty volumes or more. A smooth dish should be used, and the liquid be protected from dust, for, as Squibb has shown, any rough surface promotes decomposition. Judging from the rapid evolution of gas which occurs when solutions are heated over even a low-temperature burner, it is necessary to use a water-bath. Freezing may also be used to concentrate the liquid. Tight corking does not prevent decomposition, and the practice of wiring corks leads to dangerous pressure in the bottles. I have noted in the table the existence of marked pressure in some samples, and most of these produced, on releasing the cork, a violent noise which would be decidedly distressing in the sick-room, in addition to being an indication of imperfect preservation.—*Henry Leffmann, M.D., in Medical News.*

PYORRHEA ALVEOLARIS IN DOMESTICATED ANIMALS (PANTHER, KANGAROO, DOG, APE).—The *Journal des Connaissances médicales* has been giving some observations by Dr. Galippe, on pyorrhea alveolaris in various domesticated animals. In the cranium of a panther, prepared for a collection, he found various lesions of the teeth and alveolar borders, with erosions, of the cementum principally, and destruction of the alveolar border to the level of the cuspids. Micro-organisms had penetrated far into the dentine, the condition differing from that usually seen in caries, in that a less number of canaliculi were invaded, but more deeply, and without their diameter being notably augmented, this being the case even nearest the surface where the number of canaliculi infected was greater. The same lesions were found at the level of the osseous cementum, and still deeper, near the apex of the root, a considerable number of new formations. The cavities were filled in some places by cement-tissue of new formation, in others by true osseous tissue from outside the root, appearing to belong to the alveolar border. There had been an evident union, during the life of the animal, between the apex of the root and the maxillary, the consequence of a neoformative osteitis. The number of fibers of Sharpey, deeply penetrating the cementum, was very considerable, and this fact harmonized with the solidity of the attachments, the same abundance of means of fixity being characteristic of the molars and tusks of the elephant.

The pulp-cavity was criss-crossed by dental neoformations, differing from true dentine in the irregularity of direction of the canaliculi, their variable diameter, and numerical proportion; they color less readily with picrocarmin, and have many small lacunæ.

The next observation was upon a kangaroo which had succumbed, together with several others, to an affection of which the direct cause was unknown. In this case the same phenomena of destruction and reformation were observed, and the maxillary as well was deeply eroded. Bunches of leptothrix and of microbes were present, and in the medullary tissue little abscess-centers appeared stuffed with microbes. The blood-vessels were filled with and obliterated by white globules. Myeloplaxes were in the osseous canals, in the cavities, as in rarefying osteitis; a mixture of lesions belonging to acute and chronic inflammation. It was evident, from the number of abscesses in the ligament and in the maxillary, often near the nerves, why the animal had refused to eat, the intestine at the autopsy having been found absolutely empty.

Two voluminous abscesses containing masses of leptothrix and microbes were found in the ligament and between the two roots of a molar, the neighboring tissue being infiltrated with white globules. Between these abscesses was a cavity reinvested with epithelium, with prolongations of the same. Above the conjunctive tissue tended to dispose itself in partitions, all recalling cysts formed at the root apex of carious teeth. Some of the roots had entirely disappeared, the dentine of the crown being deeply eroded. Secondary dentine was in the root-canals and the pulp-cavities, and in some lymph-cells.

Dogs are much subject to this disease, especially house dogs, and it is hard to find the teeth they have dropped. A lower incisor showed great destruction of the cementum with no attempt at reparation, the pulp-cavity nearly filled with a concretion of pus, in certain points the pulp destroyed and replaced by coagulated albuminoid matter. The root-canal was partly obliterated by secondary dentine. The root was overlaid with irregular masses of tartar, and the notches eroded in the cement were filled with microbes and their *débris*.

It appears that the cuspids of apes are sawed off, because these animals become cross and bite when they get old. The operator, nervously looking out for his own safety, is not very careful about the cutting, and the pulp-cavity is often laid bare, becomes inflamed and infected, and the resulting abcesses are precisely like those in man under like conditions. The teeth subjected to this barbarous treatment presented like phenomena,—micro-organisms in the pulp, the canaliculi, and lacunæ, in great numbers; hypertrophy of the cementum near the root apex.—*Odontographic Journal.*

SUBSTITUTE FOR IODOFORM.—As a substitute for iodoform, a new substance of very similar chemical constitution, and next to iodoform containing the largest percentage of iodin, has been discovered. This is tetra-iodo-ethylene,

C_2I_4, called di-iodoform by Maguenne and Taine, because it can be regarded as a condensation product of two molecules of iodoform : $2CHI_3—2HI=C_2I_4$. It is prepared from acetylene di-iodid, C_2I_2, by dissolving in carbon bisulfid, adding the equivalent of iodin and evaporating. The residue is insoluble in water, but can be recrystallized out of bisulfid, chloroform, benzene, or toluene in the form of yellow prisms melting at 192° C. It is fairly indifferent to chemical reagents, being unattacked by boiling nitric acid, but decomposed by alcoholic potash. It possesses the advantage over iodoform of being free from odor.—*Notes on New Remedies.*

CRYSTALLIN is the name applied to a collodion, in which methyl alcohol takes the place of ethyl alcohol.

It differs from ordinary collodion in that it does not dry so readily.

It leaves a thin transparent skin. Pure methyl alcohol should be employed in preparing it, as the penetrating odor of impure alcohol is unpleasant.

Philip recommends the following formula for *flexible crystallin:*

Castor oil, 4 parts ;
Canada balsam, 2 parts ;
Crystallin, 40 parts.

A crystallin varnish, impervious to air, can be prepared as follows :

Crystallin, 30 parts ;
Castor oil, 4 parts ;
Zinc oxid, 8 parts.

—*Notes on New Remedies.*

BUCCAL ANTISEPSIS.—The most efficacious procedure of buccal disinfection consists, according to Dr. P. Unna, in cleaning the teeth with a brush abundantly charged with finely pulverized potassium-chlorate, after which, of coarse, the mouth should be carefully rinsed with water. Potassium chlorate thus applied exercises, he says, a powerful antiseptic action, by virtue of its microbicidal properties, and by provoking hypersecretion of the salivary and mucous glands, which contributes very efficiently to the expulsion of alimentary *débris* and epithelial and mucous concretions.

The cleansing of the teeth with potassium chlorate produces a refreshing sensation, extending, just like the antiseptic effect of the medicament, as far as the tonsils and pharynx. It constitutes the best means for combating fetor of the breath, and is, besides, considered an excellent prophylactic against the infectious anginæ. The application of potassium chlorate is not painful to healthy buccal mucous membrane, but it becomes so when there exist erosions, as in mercurial stomatitis. This pain, however, is said to be not only tolerable and of short duration, but even useful, inasmuch as it indicates buccal lesions ; it will soon disappear, and the use of potassium chlorate for cleaning the mouth and teeth is considered the most efficient treatment of mercurial stomatitis.

To persons unwilling, for some reason or other, to employ pure potassium chlorate, a dentifrice is recommended composed of prepared chalk, powdered orris-root, soap, glycerin, and fifty per cent. of potassium chlorate. The employment of potassium chlorate should be reserved to adults, there being, in children, danger of intoxication resulting from swallowing the salt.—*Amer. Med.-Surg. Bull.*

BACTERIA OF THE MOUTH.—Dr. W. H. Park concludes, in a paper read before the New York Academy of Medicine, that streptococci are always present in the human mouth after the second day of life. The long-chained cocci produce cellulitis and pus-formation. They, as well as the short-chained cocci, are present in every throat. In asylums they are present more abundantly. In scarlatina they seem to be of the same variety as in the healthy throat. On the mucous membrane they are not alone capable of producing diseases. Thorough irrigation will greatly reduce their number. Food in the mouth can cause cellulitis and abscess. There is some doubt as to direct infection in streptococcus inflammation. The streptococcus may lie dormant until aroused by exposure to cold or other exciting agents.—*The Medical Standard.*

Argyria from the External Application of Silver Nitrate.—Olshausen (*Deutsche medicinische Wochenschrift*, 1893), No. 47, page 1206) has reported the case of a woman, forty-three years old, who came under observation on account of extensive burns of the first and second degrees. For a month dressings of bismuth were applied ; then applications of a one-tenth per cent solution of argentic nitrate were made to limited areas upon the arms and back. Shortly afterward an intense stomatitis developed, in the lesions of which streptococci were found. After the lapse of a further seven weeks, transplantation of skin was practiced upon the right forearm, and as the wounds upon the back had healed, only the left arm and the right upper arm were wrapped in the solution of argentic nitrate. Some days later the stomatitis recurred, and the silver applications were permanently discontinued. Upon inspection, areas of bluish-black discoloration were seen upon the mucous membrane of the cheeks and upon the gums ; the lower lip presented an irregular zone of similar discoloration, and some of the lacunæ of the tonsils displayed bluish-black points. Similar spots were also observed on the inferior surface of the tongue, to either side of the frenum. The condition of the patient grew progressively worse ; the bluish discoloration extended ; ulceration of the inner aspect of the cheeks took place ; diarrhœa set in ; convulsions occurred, and death ensued. Upon post-mortem examination, in addition to those already noted, pigmentary deposits were also found in Douglas's cul-de-sac and upon the posterior wall of the pharynx, while the colon was the seat of a chronic pigmentary ulcerative inflammation. Chemic examination of tissue from the colon and microscopic examination of a portion of the lower lip in each instance disclosed the presence of silver. —*Med. News.*

Physicians as Prescribers of Nostrums.—There is nothing so detrimental to the honor and dignity of the medical profession as the fact that many of our physicians will prescribe a medicine of which they know literally nothing, except that it was said to have been discovered and used by the Indians of the West or the negro slaves of the South, and that it is dispensed under a high-sounding name, is protected by a trade-mark, and is recommended for every disease under heaven. All good and effective medicines have a very limited scope of usefulness, and whenever a physician becomes too negligent to study his cases and prescribe well-known and tried remedies for definite pathological conditions, he is no addition to his profession. As long as pure drugs are manufactured, as long as scientific works on materia medica and therapeutics are written, as long as ample facilities for acquiring a knowledge of medicine exist, there is no excuse for the physician acquiring the habit of prescribing patent medicines. The physician who does form such a habit becomes a self-constituted and unremunerated agent to advertise the nostrums of the unscrupulous manufacturer, and assist in deceiving the public.—*Dr. J. T. Graham, in Med. News.*

Toothache.—

℞—Camphoræ,
Chloral hydrat., āā gr. 75 ;
Cocain hydrochlorat., gr. xv.—M.

This forms an oily mixture, a small quantity of which is placed within the cavity upon a piece of cotton.

℞—Cocain hydrochlorat., gr. xv ;
Pulv opii, ʒj ;
Menthol, gr. xv ;
Pulv. altheæ,
Mucilag. acaciæ, āā q. s.—M.

Introduce upon a pledget of cotton.

℞—Ess. menthæ, ʒss ;
Chloral hydrat.,
Camphoræ, āā ʒj ;
Morphin. chlorhydrat., gr. ix.—M.

A small quantity upon a piece of cotton.—*La Riforma Medica.*

CURE OF TRIGEMINAL NEURALGIA BY STRETCHING THE FACIAL NERVE.—Dr. Schulze-Berger has adopted this treatment in a case of six years' duration, in which the neuralgia of the fifth nerve was attended with clonic spasms in the territory of the facial nerve. The curative effects of stretching the facial are, in the author's opinion, mechanical and not reflex. In consequence of the operation the clonic spasms of the facial muscles were arrested, and as a result of this the fibers of the trigeminus in this region were no longer exposed to traction. The attacks of spasms and neuralgia ceased five days after operation.—*Centralbl. f. Chirurgie.*

FATAL COCAIN POISONING.—Reclus reports a fatal accident consecutive to the injection of cocain into the urethra of an old man of seventy-two, subject to atheroma and angina pectoris. A doctor called to him on account of retention of urine from hypertrophy of the prostate, after ineffectual attempts at catheterism, performed vesical puncture. Wishing to try the catheter again, he injected from fifteen to twenty grains of a five per cent. solution into the urethra. The patient became pallid, was nauseated, and fell dead. Solution should not exceed one or two per cent.—*Times and Register.*

PYROZONE IN NASAL DISEASES.—James E. Newcomb has used a three per cent. aqueous solution of pyrozone to remove crusts or inspissated secretions from the nose or naso-pharynx. A small atomizer was employed, and the solution slightly warmed. A momentary tingling is produced by the remedy, but this quickly subsides. He regards pyrozone as a valuable agent, not only in cleansing the cavities, but in relieving the symptoms due to enlarged glands at the base of the tongue.—*Journal of the American Medical Association.*

TRICRESOL.—This substance, called in the trade "trikresol," has been made the subject of an experimental research by Dr. M. Charteris, Professor of Materia Medica and Therapeutics in the University of Glasgow, who reports in *The Lancet* for March 31 that the liquid is a mixture of orthocresol, metacresol, and paracresol, soluble in water in the proportion of from two to two and a half per cent. He finds that it is three times as strong as pure carbolic acid as a germicide, and only a third as poisonous. Consequently, he remarks, its advantages for surgical purposes are very pronounced, and in all probability some combination of it with an alkaline base will in the future be prepared which may with safety and profit be administered internally in specific infectious diseases.—*New York Medical Journal.*

"KRESOLUM purum liquefactum" is the name applied by H. Nördlinger to a new antiseptic introduced by him as a substitute for (and probably identical with) trikresol. He describes it as kresol-hydrate, having the formula $C_6H_4 . CH_3 . OH + H_2O$, from which the *Pharm. Centralhalle* argues that the product contains the maximum amount of water which it will hold in solution. Dissolved in water, a two and one-half per cent. solution can be prepared readily by shaking; the product is said to have three-fold the antiseptic power of carbolic acid, and hence a one per cent. solution is equal to a three per cent. carbolic-acid solution.—*Notes on New Remedies.*

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HINTS, QUERIES, AND COMMENTS.

THE *Philadelphia Polyclinic*, May 12, 1894, contains an article on "Pyorrhea Alveolaris and its Local and General Treatment," by Dr. Joseph Head, in which he says, among other things, in describing the condition, "The tooth finally drops out, its root covered here and there by dark ceruminal [?] tartar, and *white nodules, not unlike shad-roe eggs, that are recognized as the germs of the disease.* [Italics ours.]

"This disease is contagious, and may be transmitted by a kiss or the careless use of unwashed drinking-vessels; but if the mouth be thoroughly healthy the germ will not be able to find lodgment. Hence, the great danger lies in a predisposition of the mouth to receive the infection.

"The causes that produce this predisposition are both local and systemic.

"The local causes are carelessness in cleaning the mouth, excessive secretions of tartar.

"The systemic causes are excessive quantities of uric and phosphoric salts in the blood, which being deposited upon the surfaces of the roots below the gum-line, tear the root from its adjacent tissues and eventually cause the pocket into which the germ finally gains entrance, either through the blood or the saliva."

The statements here quoted set forth some new features in the etiology of pyorrhea alveolaris. The theory that the disorder is of bacterial origin is not new, but when we are told that it is contagious and may be transmitted by a kiss or unwashed drinking-vessels, it places its bacterial character in a new and important light. Moreover, the statement that the germs of the disease are "white nodules not unlike shad-roe eggs" constitutes not only a novel contribution to the etiology of this disorder, but a unique discovery in bacteriology. O pyorrhea alveolaris, what crimes are committed in thy name!

SODIUM-PEROXID SOLUTION.—The successful use of sodium peroxid as a bleaching and sterilizing agent depends upon the care exercised in making the solution of it. If the solution be made hurriedly by the addition of considerable quantities of the powder to the water at one time, the evolution of heat, due to the energy which attends the combination, produces a rapid elevation of the temperature of the solution. This causes a decomposition of the peroxid, a loss of its loosely combined extra atom of oxygen occurs, and the resulting solution is little more than a solution of sodium hydrate or ordinary caustic soda, which is practically inert as far as bleaching power is concerned. To obviate the rise of temperature and consequent decomposition of the peroxid, the solution must be made slowly, and the vessel in which it is made should be surrounded by ice-water or some cooling mixture; or the solution can be made by gradually dropping the powder upon the surface of a piece of ice about the size of a chestnut, contained in a small beaker of about one-ounce capacity. Dr. F. T. Van Woert, who has had an extended and satisfactory experience with sodium peroxid as a bleaching and sterilizing agent, kindly furnishes, for the benefit of COSMOS readers, the following detailed account of his method of preparing the solution:

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—I find, after many experiments, that the most satisfactory solution of sodium peroxid is obtained in the following manner: Take a common tumbler about half full of distilled water, place it in the center of a good-sized pudding-dish, and pour all the cold water around it possible, without floating the glass. Add the sodium peroxid in very small portions,—about what could be taken upon the point of the large blade of a pocket-knife,—dusting it in the water slowly to cause as little agitation as possible, and this amount should not be added oftener than once in a half-hour, being careful to have the sodium peroxid finely powdered. This to be continued until the preparation begins to look opaque as powder is added. Let it stand over night, and it is then ready for use. If a lump about the size of a small bean is dropped into water, you will notice on the margin of the line of agitation a ring of color resembling iodin. A solution made in this way has always proven useless to me. If the peroxid is put in the water as I have suggested, there will be very little surface agitation and none of the discoloration, the result of which is a solution that has never failed. This takes several days to make, but it will more than pay for the time consumed, in its prompt action as a bleacher and sterilizer. I have placed this solution in the hands of a number of gentlemen, to be used in the treatment of abscessed roots, and to the writing of this not a single failure has been reported. The general impression is that sodium peroxid is for bleaching only, while it is the most valuable preparation ever found for the treatment of dead teeth, if used in the following manner: Cleanse the root-canals of such septic matter as possible to get at with instruments, and dry them with hot air; then carry small ropes of cotton, saturated with a full-strength solution, as near the foramen as you can, using orange-wood shaped like fine probes, and cover with a temporary stopping, letting the whole remain for two days, after which wash with hot water, and fill in the usual manner. F. T. VAN WOERT.

AN EXPEDITIOUS AND ACCURATE METHOD OF GRINDING AND FITTING THE LOGAN CROWN.—It is a well-known fact that the improved Logan crown is the best porcelain crown upon the market. The great objection to it is in the fact that it is a mere matter of guess-work when they are ground to approximately fit, for we never know when they fit by the old process.

Having this before me, I have originated a method by which to expeditiously and accurately grind them to a perfect apposition with the abutment of the root to be crowned.

First prepare the face of the root to be crowned as desired, and having selected a suitable crown bend the pin, if necessary, so as to make a proper alignment.

Next place a piece of paraffin wax around the pin next to the porcelain; then take No. 60 tin foil and trim a disk a little larger than the abutment; then pierce the center of disk with the crown pin, pushing disk down until it touches the wax, place crown on the root and force it to place, the wax driving the tin-foil disk to a perfect apposition with the abutment of the root. Remove crown with the wax holding the tin-foil disk in position, and with a pair of sharp-pointed scissors snip the edges of disk slightly all around. Place a small pellet of wax on end of pin, then insert pin up to the porcelain in quick-setting plaster; after plaster hardens warm crown and remove, the snipped edges of disk serving to hold it in position; clean off wax and replace crown of model, and you have a perfect metallic surfaced model of the abutment of the root to which to grind, with a perfect view of every surface of the root, the wax which was on the end of the pin allowing it to penetrate the plaster as the porcelain is ground away. By this method a Logan crown can be made to fit perfectly in ten minutes and no guess-work. Try it once, and you will be more than satisfied with the results obtained; this is also applicable to the bicuspids.—T. P. HINMAN, in *The Busy Dentist.*

[This method as described by Dr. Hinman, while it undoubtedly yields good results, appears to be unnecessarily complicated.

The following method, which is by no means new, will in the majority of cases enable a perfectly close joint to be made between the crown and root-end. Cut several small pieces, about one-quarter inch square, from a strip of thin articulating paper. In the center of each punch a hole with the coffer-dam punch, about the size of the largest hole made by the Ainsworth punch. Having prepared the root-end, slip the perforated piece of articulating paper over the pin of the Logan crown and press it firmly into position, in contact with the root. Upon withdrawing the crown and removing the articulating paper, the points of contact will be found to be marked black. Grind these off carefully, readjust on the root as before, grind again, and continue the operation of fitting and grinding until the mark made by the articulating paper on the contact surface of the crown presents as a uniformly unbroken black ring. When this has been accomplished, the crown will be found to fit the root-end with the utmost accuracy. The advantages of fitting a crown directly to the root are, it would seem, self-evident from the mechanical standpoint, and involve beside the least expenditure of time.—E. C. K.]

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Would Dr. Darby kindly mention in your journal if he carries the heating of Abbey's old-fashioned soft foil to redness, and if he uses any particular apparatus for heating? A CONSTANT READER.

[In reply to "A Constant Reader," I will say that I do not heat Abbey's or Morgan & Hastings' soft foil to redness. After the leaf has been cut into thirds, it is then folded into a tape about one-eighth inch wide. This is placed upon a piece of mica and held over the flame of a Bunsen burner. I have no definite rule as to how long it should remain over the flame, but long enough to heat it *thoroughly*. There would be no injury done to the working properties if it were heated to redness, if done as I have indicated. I often use soft gold foil in the form of ropes, and heat it after the same manner. The heat seems to toughen the gold without rendering it cohesive,—a property which I am not anxious to have when using the gold in the bottom of cavities. I want softness and great toughness, but not much cohesion. As I approach the surface of the filling I use extra-cohesive foil or Watt's crystal gold.

EDWIN T. DARBY.]

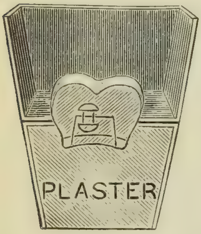
THE GINGIVAL PORTION OF CERTAIN APPROXIMAL CAVITIES.—On reading Dr. Kells's article entitled "Amalgam," in the April issue of the DENTAL COSMOS, I note the use of carbolic acid recommended to prevent that oozing of moisture from the gum which makes it so difficult to keep the margin of certain gingival cavities dry, when the use of the dam or spunk is impracticable.

I will say that I have found the use of trichloracetic acid preferable to carbolic acid, the eschar which it makes being much dryer than that formed by carbolic acid. It can be used of the same strength as prepared for use in the treatment of "pyorrhea,"—viz, by opening the original ounce bottle of crystals and simply filling the interspaces with water, making an ounce bottle of liquid trichloracetic acid from the entire original bottle of crystals. The application of trichloracetic acid of this strength keeps the gum-margin so dry that oxyphosphate can be inserted in contact with it without injury.

I find the matrix a valuable adjunct in the use of amalgam in many cases, using for this purpose a thin piece of German silver or cold-rolled steel, trimmed to approximate the curve of the cervical margin and forced just a trifle between the gum and the margin of the cavity. The labio-lingual plane of the matrix can be formed with crowning-pliers to any shape desired,—in some cases perfectly straight, and in others even convex at the gingival portion of the surface next the cavity, while concave on the same surface near the morsal portion. A matrix thus formed can be held in place with a wedge or two, having the wedges made by the assistant and kept on hand in various sizes, preferably with scarcely any taper from end to end, but with the coronal edge thinner than the gingival edge, this difference being easily increased by the insertion of a smaller wedge at the side of the larger one near the gingival edge. It is scarcely necessary to add that a wedge is never used a second time. The matrix may also be secured by tying a thread around it and the tooth. A matrix thus made and secured consumes but little time and facilitates the work very much, and also avoids lacerating the gums by the use of steel or orange-wood to smooth the cervical margin. The matrix being held in close proximity to the cervical margin, it is not necessary to use any instruments on the surface of that portion of the filling, and the "knuckle" has a smooth surface which more nearly approximates the adjoining tooth than could be done in shaping it with instruments.

The adaptation of the matrix to the surface of the root of the tooth can be made more perfect (especially does this apply to the superior bicuspids) by allowing the thread to contain a knot or two against the center of the matrix. —W. E. Walker, D.D.S., Bay St. Louis, Mo.

Method of Making Caps for Gold Crowns.—A simple method of making caps for gold crowns, or of getting a matrix for stamping out the cap, is to first have two small flaring Russia-iron boxes made with the bottom placed about one-half to three-fourths of an inch above the base. In the center of the bottom of one have a hole cut the size of the neck of a bicuspid, and the other of a molar of the S. S. White countersunk-pin teeth. These holes should be large enough to accommodate the larger sizes of these forms. Now fill the space beneath the bottom with sand, Melotte's compound, or plaster. Then place on the bench, with the right side up, and press the countersunk tooth into the material below, leaving exposed the desired length of cusp. Smooth off any of the plaster or other material from around the cusp. Now pour Melotte's or other metal, melting at a low temperature, into the box over this exposed cusp, and you have a tip-top die to strike up a cap. For the price of one of these teeth any desired form of cusp can be had; besides, by a trial of the tooth, you can determine whether it will make the most desirable articulation.



The sectional view will give a good idea of the entire suggestion. These boxes will cost about fifteen cents each.—Samuel A. Milton, Clinton, Mo.

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A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

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The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a Thesis.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING APRIL, 1894.

April 10.—No. 518,175, to Stephen H. Brooks. Dental hand-piece.
" " No. 23,189, to William G. Hullhorst. Design for dental cabinet.
April 24.—No. 518,701, to George B. Richmond. Dental disk-carrier.
" " No. 518,771, to George W. Archer. Head-rest.
" " No. 518,887, to John Hood and Stephen H. Reynolds. Dental chair.

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ORIGINAL COMMUNICATIONS.

AN INTRODUCTION TO THE STUDY OF THE BACTERIO-PATHOLOGY OF THE DENTAL PULP.

BY W. D. MILLER, M.D., D.D.S., BERLIN.

AFTER the decay of the teeth, the diseases of the pulp, particularly where their results, such as pericementitis, periostitis, alveolar abscess, etc., are taken into consideration, form the most important of the pathological processes with which we as dentists have to do.

The investigations of the last ten or fifteen years have furnished a satisfactory explanation of the chief phenomena associated with the decay of the teeth, but we are still very much in the dark as to the bacteriological aspect of the diseases of the pulp, pericementum, etc.

We assume, in a general way, that bacteria must in some manner be connected with these processes; but the vital questions as to what bacteria we have to do with, how they obtain access to the pulp, what toxic products they form, etc., have not been solved.

In the experiments recorded in the following pages, I have endeavored to furnish an introduction to the study of the bacterio-pathology of the pulp, and hope to have laid a foundation upon which future experimenters may build, in order to arrive eventually at results not only of scientific value, but which may be applied in the daily treatment of diseased conditions of the teeth and neighboring parts.

These investigations were begun in the spring of 1891, and had made considerable progress when an attack of influenza compelled me to give up work for three months, during which time all of my cultures died, so that in the fall of 1892 I was forced practically to begin my experiments anew. A similar mishap occurred again in the summer of 1893, when many of the newly started cultures, although transplanted weekly during my absence, again died out, while others became impure.

Only now, since I have for the third time occupied myself uninterruptedly for nearly a year, many hours daily, with this question, am I able to communicate the results of my experiments.

I have, in all, examined over two hundred and fifty tooth-pulps, in one direction or another, but shall present only a few of the general results derived from my earlier experiments, whereas the last fifty pulps will be treated of in detail.

The questions which appeared to me to demand solution in the first place were,—

1. What results are obtained by microscopical investigations in regard to the presence of bacteria in different diseased conditions of the dental pulp?

2. What micro-organisms are obtained by the method of pure culture?

3. What effect has the incorporation of pure cultures from diseased pulps on the animal body?

4. What effect has the incorporation of diseased pulps, or pieces of such, on the animal body?

5. How are the intense putrefactive processes in the pulp to be accounted for, and what significance have they?

6. Have we remedies at our disposal which are capable of rendering putrid pulps innocuous for the animal organism?

Microscopical Examination of Diseased Pulps.

The teeth to be examined should be thoroughly washed, dried, and split open by the excising forceps, in such a manner that no possible contamination of the pulp from without may take place. By means of a platinum needle, a minute quantity of serum, pus, or decomposed pulp-tissue is spread out upon a cover-glass and stained in the usual manner for bacteriological preparations. The stains used were chiefly methylen-blue, methyl-violet, Ribbert's solution of dahlia, and carbol-fuchsin. Methylen-blue is a weak stain, but has the advantage of coloring the tissues but faintly, compared to the bacteria. The other solutions, particularly carbol-fuchsin, are much more powerful, but they stain the pus and blood-corpuscles, fibrin, etc., so intensely that the bacteria may be lost to sight.

On the other hand, bacteria which take on the color with difficulty, and which might be easily overlooked when treated with methylen-blue, often appear quite distinct when fuchsin is used. Both solutions, then, have their advantages and disadvantages.

When the pulp-chamber is open, all possible species of bacteria that occur in the mouth may, of course, be brought into contact with the pulps. I have therefore considered such cases but little in my investigations, and turned my attention almost exclusively to cases where the pulp-chamber was still closed and the pulp not contaminated by material from without. In some instances, however, where there was a small opening into the pulp-chamber, I took the material for examination from some point far removed from the exposure; for instance, when there was a slight opening on the mesial surface of a molar, the material for examination was taken from the distal root.

In a few cases, however, an examination was made where the pulp-chamber was completely open and filled with food. These examinations presented some points of interest which will be briefly noticed.

Examination of Teeth with Open Pulp-Chamber.

In three cases where the pulp-chamber was wide open and filled with food and débris, I found among different species a great preponderance of large, round cocci, whose physiology I have not yet studied more closely.

Very interesting and instructive results were obtained by examining material from different parts of the same tooth. In the case illustrated in Fig. 1, the pulp-chamber at *a* was wide open and filled with food particles, which had a half-sour, half-putrid odor; at *b* the pulp was putrid and very foul-smelling; at *c* there was a small abscess, filled with pure white pus, while the tissue between this point and the apex of the root was highly inflamed and bright red.

FIG 1.

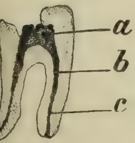


FIG. 2.

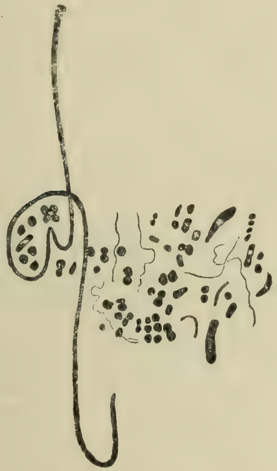


FIG. 3.

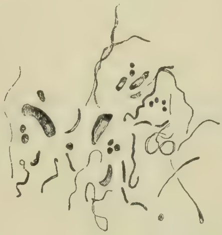
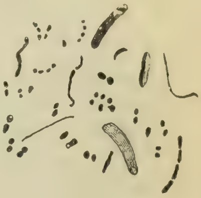


FIG. 4.



Material from the pulp-chamber (*a*, Fig. 1) contained the forms shown in Fig. 2; material from point *b* those shown in Fig. 3, and from the point *c* those shown in Fig. 4. We perceive a gradual diminution of the large cocci, and the appearance of small, delicate cocci and diplococci.

Examination of the Inflamed Pulp.

Cases of incipient inflammation of the pulp are difficult to obtain, because usually the teeth are not extracted until the pain has become very severe, and on splitting open the tooth we generally find suppuration already present. Even in cases where the inflammation appears to be in its beginning, the microscope will often reveal the presence of pus. Consequently I have had occasion to examine only a comparatively small number of cases of inflammation of the pulp in its earliest stage. *A priori* we should expect the bacteria which occur in the earliest stages of inflammation to be met with later on in suppuration and gangrene of the pulp, because it is not probable that one species causes the inflammation and then makes room for another species to attend to the suppuration. At the same time, in these later processes we should expect to find a much larger number of bacteria as well as a greater number of different kinds; particularly where a considerable period of time has elapsed between the appearance of the inflammation and the consequent suppuration, there is a possibility or even probability that in the mean time new species will have been added from the carious dentine, while those already present will have greatly multiplied.

Out of a series of cases the two following may serve to present the bacteriological aspect of an inflamed pulp :

Case 1.—Lower molar, extensive caries on the grinding-surface. Pulp covered with a thick layer of partially decalcified dentine ; the softened dentine at the time highly discolored and fairly dry. On splitting the tooth the whole surface of the pulp corresponding to the grinding-surface of the tooth appeared intensely red. A cover-glass preparation contained the forms shown in Fig. 5.

FIG. 5.

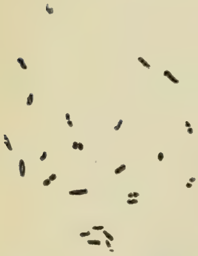
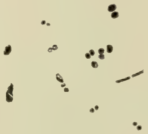


FIG. 6.



Case 2.—Lower molar, with caries of the mesial surface. Pulp-cavity not opened, and the dentine directly over the pulp but slightly decalcified. The inflammation restricted to a circumscribed point on one horn. Micrococci (diplococci) and a few rods (Fig. 6).

The severity of the inflammation usually does not appear to be proportionate to the number of bacteria present, and in a highly inflamed pulp we may be able to find but few bacteria. From this fact, in connection with others to be referred to later on, the conclusion appears to be justified that the inflammation is due to the combined action of the bacteria and of their products (acids, ptomaines, etc.) with which the carious dentine becomes impregnated.

Microscopical Examination of Purulent Pulps.

I have made no attempt in my experiments to arrive at any possible distinctions which might be supposed to exist between the bacteria associated with different conditions of suppuration of the pulp ; for while it is not permissible *a priori* to exclude the possibility of different forms of suppuration of the pulp—abscess, ulcer, local or total suppurative gangrene—being brought about by specifically different kinds of bacteria, it is exceedingly improbable, and experiments thus far made point to an opposite conclusion.

Case 1.—Pulps covered with an extremely thin layer of semi-decalcified dentine, highly inflamed ; on the surface a thin film of pus. Bacteria present shown in Fig. 7.

Case 2.—Softening of the dentine up to the pulp, but the latter still covered on all sides ; superficial suppuration. Examination of the pus showed cocci and bacilli.

Case 3.—Pulp not exposed ; small abscess in one horn ; plump cocci and diplococci ; a few isolated bacilli (Fig. 8).

Case 4.—Molar. Pulp on one of the mesial horns covered with but a very thin layer of decomposed dentine ; in the crown of the pulp an immense abscess with yellowish-gray pus ; numerous cocci and diplococci ; a few thick bacilli and some thin, pointed bacilli ; a few vibriones ; many long spirochætes (Fig. 9).

Case 5.—Pulp covered by a layer of softened dentine one and one-half to two mm. thick. The whole pulp-chamber and a large part of the root-canals filled by an immense abscess; numerous cocci and diplococci; several fine vibriones and long, thin threads.

Case 6.—Molar. Pulp covered with softened dentine; slight superficial suppuration of one of the mesial horns; masses of long spirochætes in almost pure cultures; a few vibriones and very large bacilli (Fig. 10).

FIG. 7.

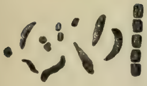


FIG. 8.

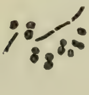
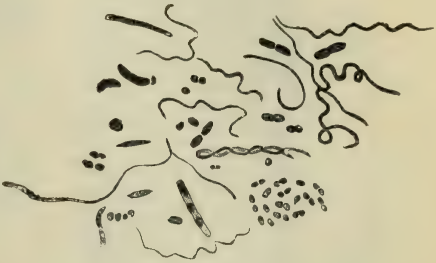


FIG. 9.

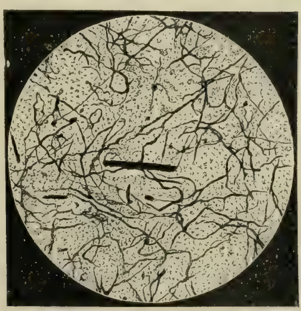


Case 7.—Molar pulp. At one horn covered only with débris; abscess; cocci and diplococci of different sizes; also many slender, long, curved bacilli (comma bacilli).

Case 8.—Pulp still covered with hard dentine. Abscess, consequently a case of pulpitis septica (Arkövy); cocci and diplococci varying in size.

Case 9.—Pulps covered with a layer of softened dentine one to one and one-half mm. thick; abscess; one horn discolored green; bacteria as shown in Fig. 11.

FIG. 10.



An almost pure culture of Spirochæte dentium from a suppurating pulp. After the photogram. 1000:1.

Case 10.—Thick layer of softened dentine. Directly over the pulp a layer of hard dentine as thick as writing-paper; fine open abscess with pure white pus and very red line of demarcation; bacteria as seen in Fig. 12.

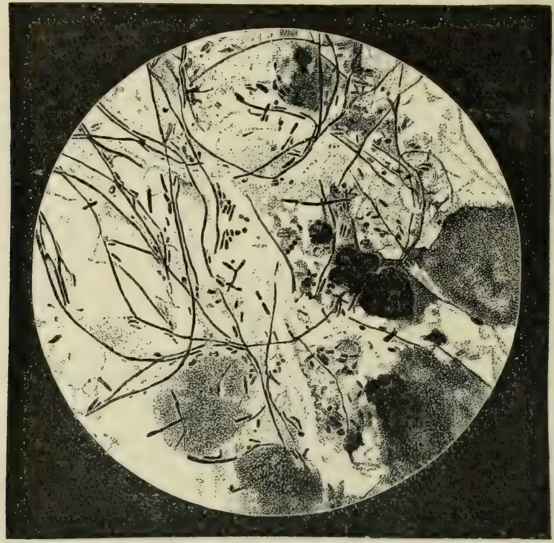
Case 11.—Pulp covered with layer of softened dentine two mm. thick. Superficial suppuration of one horn, which, as well as the underlying dentine, is discolored green; cocci and diplococci.

Case 12.—Similar to 11, but without the green discoloration. Bacteria as in Fig. 13.

Case 13.—Similar to Case 11. Large abscess with viscid pus; only isolated plump diplococci of different sizes.

Case 14.—Similar to Case 11. Abscess with yellowish-white pus; bacteria as in Fig. 14.

FIG. 11.



Cover-glass preparation from an abscess of the pulp. Pus-corpuscles, micrococci, bacilli, and leptothrix. After the photogram. 1000:1.

Case 15.—Pulp covered with a very thin layer of dentine. Suppurating, putrid (gangrenous); various forms of bacteria; comma bacilli and spirochætes particularly numerous; also large, snake-shaped cells (Fig. 15).

FIG. 12.

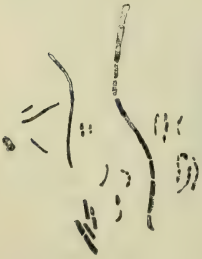


FIG. 13.

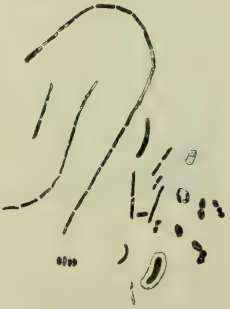
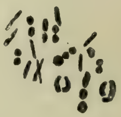


FIG. 14.



A further series of cases yielded the same results, from which it may be seen that we almost without exception have to do with mixed infections. The repeated appearance of spirochætes and vibriones (comma bacilli) is rather surprising. We had an almost pure culture of the former in Case 6 (Fig. 10). The small cocci and diplococci are to be considered as a constant occurrence; they almost always appear separately, not in chains; even *short* chains are only occasionally found. The number of cocci present varies considerably. Sometimes only isolated cells, in other cases large masses are to be found, but rarely in such quantities seen in Fig. 16.

Microscopical Examination of Putrid Pulps.

Case 1.—Bicuspid. Gutta-percha filling over an exposed pulp, the latter totally putrid; very foul-smelling bacteria, as in Fig. 17. Only three colonies developed in the culture, two of small cocci and one of larger, oblong cocci.

FIG. 15.

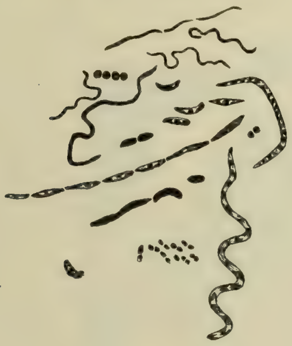
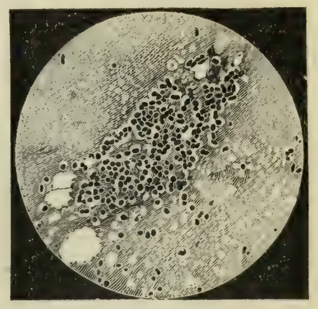


FIG. 16.



Masses of cocci from an abscess of the pulp After the photogram. 1000:1.

Case 2.—Pulp covered with softened dentine one-half mm. thick; pulp totally putrid. Bacteria as in Fig. 18. Only one species of cocci developed in pure culture.

Case 3.—Molar with acute caries on grinding-surface; pulp completely covered; putrid, foul-smelling. Masses of cocci and bacilli, the latter partly club-shaped (Fig. 19).

Case 4.—Pulp covered with only a thin layer of decomposed dentine; pericementum much thickened; alveolar abscess; pulp black, foul-smelling. Bacteria as in Fig. 20.

FIG. 17.

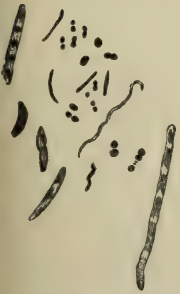
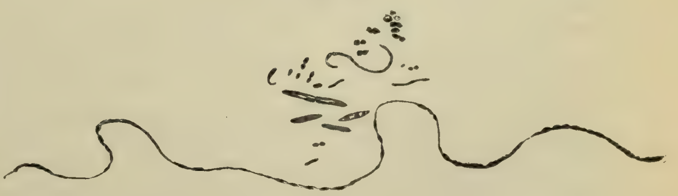


FIG. 18.



Case 5.—Pulp covered with softened dentine; purulent, putrid (gangrenous). Bacilli and long threads with spores (Fig. 21).

Cases 6 and 7 gave the forms seen in Figs. 22 and 23.

Other cases yielded similar results.

We see that the small cocci and diplococci occurring in all the cases of suppuration of the pulp are also to be found in putrid pulps. But other forms seem to have been added which are not met with so often in the processes of suppuration, especially the long, stiff, pointed bacilli and threads.

In these cases very instructive results are also obtained by examining material from different parts of the pulp, especially where, as is a common occurrence, the crown is in a putrid condition, while suppurating processes are still going on in the root. Figs. 24 and 25 illustrate a case of this nature. The first is from a preparation obtained from the coronal portion of the pulp which was intensely putrid ; the second from the radical portion, which was alive and suppurating.

FIG. 19.

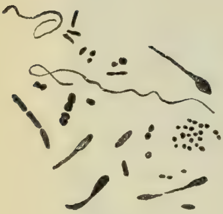


FIG. 20.

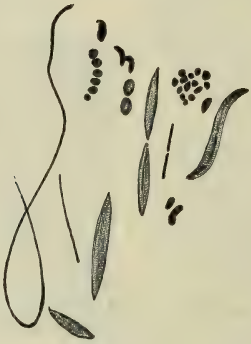


FIG 21.

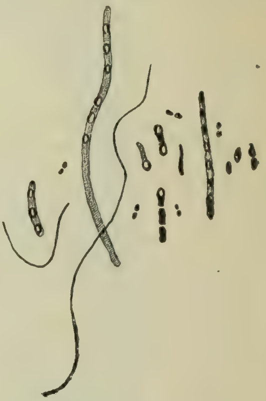


FIG. 22.

FIG. 23.

FIG. 24.

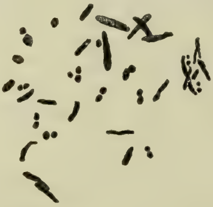
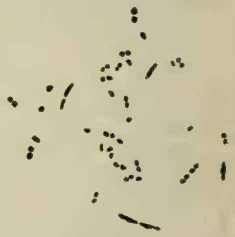


FIG. 25.



Examination of Sections of the Pulp.

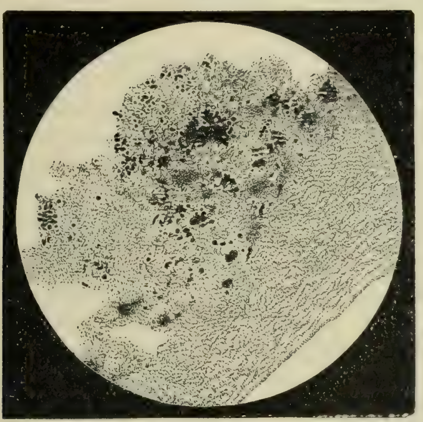
It is a matter of considerable difficulty to obtain sections of the diseased pulp which are adapted for bacteriological examination. I have secured the best results by cutting the fresh pulp on the freezing microtome. The staining and mounting is also accompanied by great difficulties, since the thin, delicate sections, when placed in alcohol, shrink to about half their size, become shriveled and turned up at the edges ; in the further treatment they also often get into folds or tear, so that they become utterly unfit for examination.

I have succeeded best by taking each section separately upon the end of a glass rod and bringing it successively into twenty per cent., forty per cent., seventy per cent., and finally into absolute alcohol.

The staining (after Gram), clearing up, etc., are also done on the rod. With care and experience we succeed in this way in obtaining specimens which show no folds and but slight shrinkage.

The number of pulps that I have examined in this way has been too limited to enable me to form a conclusion regarding the very important question as to how the bacteria spread in the tissue of the pulp. In the accompanying illustration (Fig. 26), taken from the margin of a large ulcer of the pulp, we see a gradual invasion of the tissue by micrococci, singly or in masses.

FIG. 26.



Invasion of the pulp-tissue by micrococci, from margin of an ulcer. After the photogram. 400 : 1

In sections I have found a preponderance of micrococci, singly or in groups, less often in short chains. (Consult in this connection the monograph of Rothman, "Patho-Histologie der Zahnpulpa und der Wurzelhaut," Budapest, 1889.)

1. REGARDING THE MANNER IN WHICH THE INFECTION OF THE PULP IS BROUGHT ABOUT.

There are various channels by which it is supposed that bacteria may obtain access to the pulp of the tooth. These are,—

1. Through the medium of the blood. There can be no doubt that bacteria which have entered the blood through wounds may be deposited in the dental pulp as well as in any other part of the body, wherever there may be a *locus minoris resistentiæ* (point of less resistance) at the time. This manner of infection suggests itself in particular in connection with the necrotic pulp, but we have unfortunately no means of determining, with certainty, whether and with what frequency infections of this nature actually take place.

2. It has been suggested that bacteria may work their way to the pulp through the thin layer of cementum and the dentine at the neck of the tooth. It is, however, rather doubtful whether they can traverse the cementum and very fine ramifications of the dentinal tubules, unless caries is present. This point might and should be determined by a microscopical examination of an adequate number of sections from the neck of the tooth.

3. The chief channel of infection is through the decayed dentine. This point might almost be taken for granted, but it may be of interest to note that in a case of suppuration of the pulp, sections made of the overlying dentine showed the same forms of bacteria as were found in the pulp itself.

The irritation of the pulp brought about by the products of decomposition in the carious dentine render it more susceptible to the action of the bacteria themselves. The question whether an infection of the pulp may take place as long as it is covered by hard dentine, must be answered in a positive sense. Out of fifty cases of diseased pulps, I noted three in which the pulp was still covered by a layer of hard dentine about one-eighth to one-quarter mm. in thickness.

Culture Experiments: Methods and Results.

The teeth employed were almost exclusively such as had been extracted at the Dental Institute of Berlin between the hours of eleven and one, and were kept in a moist condition till I was able to examine them, which was usually between three and four o'clock.

They were first brushed in a five per cent. solution of sublimate, and then transferred to absolute alcohol for a short time, whereupon they were separately taken out with sterile pliers and the alcohol burned off. Care must be taken that the tooth does not become so hot as to kill the bacteria contained in the pulp. The object of this treatment is to devitalize all the bacteria upon the surface of the tooth, so that the pulp may not by any possibility become contaminated by them. The tooth is then split open with sterilized excising forceps, which must be so applied as not to come into contact with the pulp when the tooth splits, the purpose of this precaution also being to get at the pulp without its becoming infected from without. Having in this manner laid open the pulp-chamber, the material obtained is made use of for the customary cultures and infections.

The cultures were made on glycerin-agar in test-tubes and in Petri vessels, also on gelatin.

Where there was sufficient material at my disposal, small pieces were introduced under the skin of mice, or the pulp was rubbed up in sterile water and the emulsion thus obtained injected either into the abdominal cavity or subcutaneously. Subcutaneous inoculations of this kind usually led to the formation of abscesses, the pus of which was used for further culture experiments.

Finally, a mouse was inoculated from each agar culture when two or three days old, for the purpose of determining whether pathogenic bacteria were present or not.

Of the general results obtained, I give the following:

Of eighty-five cases of suppuration of the pulp, the cultures yielded in thirty-three, only cocci; in twenty-five, only bacilli; in nineteen, different forms; while in nine cases no growth took place.

Cultures from fourteen gangrenous pulps yielded, in seven, only cocci; in two, only bacilli; in four, cocci and bacilli. In one case no growth was obtained.

Out of forty cases of putrid pulps, I found, in seventeen, only cocci; in six, only bacilli; in nine, cocci and bacilli, and in eight no growth occurred.

Out of seventeen cases of inflamed pulps I found, in four, only cocci; in three, only bacilli; in five, cocci and bacilli; and in five no growth took place.

It must strike every one that the results of the culture experiments do not tally with those of the microscopical examination. While a careful microscopical examination of the diseased pulp almost invariably revealed a mixed infection, the pure cultures show, in the majority of cases, either only cocci or only bacilli. This occurrence is, however, not inexplicable, because if one species is in strong preponderance it may easily, especially if it proliferates quickly, overrun and cover up the others.

It also happens that where one species is but scantily represented, it may, for some reason or other, not develop at all upon the agar plate, although it may belong to the cultivable species.

A third possibility to be considered in the putrid pulps is that the bacteria visible under the microscope may already have died from lack of food. Besides, in the fourth place, many species of bacteria occurring in the diseased pulp, vibriones, spirochætes, the stiff pointed bacilli and threads, have not been found cultivable on artificial media anyway; and possibly there are still other uncultivable pulp-bacteria.

In detailing the results of the culture experiments, I will restrict myself to the last fifty cases examined. These include nine cases of inflammation of the pulp, twenty-three of suppuration, sixteen of putrefaction, and two of alveolar abscess.

Of the nine inflamed pulps, two developed each two species of cocci; two developed only one species each; one gave both cocci and bacilli, and one only bacilli. In three cases the culture remained sterile.

Of the twenty-three suppurating pulps, six gave only one species of cocci; three gave two species each; two gave one species of bacilli; in two other cases, two species of bacilli developed; in five, one species of cocci and one of bacilli; in two, two species of cocci and two of bacilli; in one case, three species of cocci and one of bacilli; in two cases no growth occurred.

Of the sixteen putrid pulps, seven developed each one kind of coccus; in two cases, two species of cocci appeared; in one, three species; in another, one species of bacilli; in one case, two kinds of bacilli; in two cases, one species of bacilli and one of cocci; in two cases, no growth. From the pus of one of the alveolar abscesses I cultivated two species of cocci; from that of the other, only one species of cocci.

In twenty-seven of the fifty cases the material for examination was planted directly on gelatin as well as on glycerin-agar. Growth took place in nineteen cases; in eight the gelatin remained sterile; in three it became strongly liquefied; in one case only slightly so.

In a later series of nine diseased pulps, growth on gelatin occurred seven times.

It could not be ascertained from these gelatin cultures whether only one or more species had developed in each test-tube, but the cultures certainly prove that species of bacteria that grow on gelatin occur with considerable constancy in the diseased pulp.

The following very incomplete grouping of the bacteria of the pulp may serve our purpose until further experiments enable us to make a better one:

- Bacteria of Pulp
  - Cultivable
    - Bacilli.
    - Micrococci
      - Growing on gelatin
        - Liquefying.
        - Non-liquefying.
      - Not growing on gelatin.
  - Non-cultivable
    - Stiff, pointed bacilli.
    - Vibriones (comma bacilli).
    - Spirochætes.
    - ? ? ?

1. The Cultivable Bacilli of the Dental Pulp.

Among the fifty cases under consideration there were, as stated above, six cases where no growth occurred, consequently forty-four in which colonies developed. In nineteen of these forty-four, colonies of bacilli developed in the glycerin-agar cultures ; in fifteen cases one species, and in three two species.

The supposition would seem justifiable that species of bacilli occur in the pulps which are not cultivable on glycerin-agar, since the microscopical examination almost invariably reveals bacilli, while in the culture media they appear in only thirty-six per cent. of all the cases.

I attribute comparatively little importance to the cultivable species of bacilli found in the diseased pulps as causes of inflammation and suppuration, since I did not meet with any species which appeared with any considerable degree of constancy, and with few exceptions inoculations with the pure cultures resulted negatively. I shall therefore not devote much time to the bacilli.

Fig. 27.

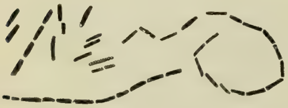


Fig. 28.

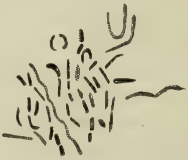
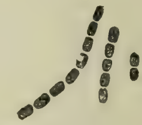


Fig. 29.



Among the different species of bacilli the form represented in Fig. 27 was met with most frequently. It grows as bluish-gray colonies, which, under a power of seventy-five diameters, show long loops of bacilli, and otherwise present much similarity to colonies of anthrax.

A second species occurs in the form shown in Fig. 28. It grows on glycerin-agar in grayish-blue, moist-looking colonies, which appear yellowish under the microscope, and have an indented, rather transparent margin. The larger colonies often show a streaked or veined appearance.

A third species produces small gray colonies (under the microscope, iron-gray), which show long loops of bacilli under a power of seventy-five diameters. Short, thick bacilli, single or in chains (Fig. 29).

I have, further, twice met the form given in Fig. 30, once as a pure culture from an inflamed pulp.

The species of bacilli reproduced in Fig. 31, which forms pointed, often more or less curved, bacilli, I have only met in my former cultures. Lately I have not been able to find it.

The three following species, which were met with each one in over two hundred cases, seem to me to be deserving of particular notice :

1. An upper lateral incisor, which had been treated eighteen months previously, presented an attack of acute pericementitis which made it necessary to remove the filling. When the cotton with which the root-canal had been filled was taken out, it was followed by a flow of pus, out of which I was able to cultivate a short bacillus that proved to be highly pathogenic for mice and rabbits.

A blood-serum culture applied interperitoneally to mice caused death in thirty hours. Masses of short, thick bacilli in the peritoneal exudations, also a few rods in the blood.

This bacterium grows on gelatin, liquefying it, and is probably identical with Bacterium gingivæ pyogenes, formerly described by me.

2. A left upper molar had been filled directly over a freshly devitalized pulp. It had remained without reaction for two years. Suddenly pericementitis of a very violent nature set in, which necessitated the extraction of the tooth.

I found the pericementum very much thickened and infiltrated with pus, and the pulp in a semi-liquid, exceedingly putrid condition. In the latter a bacillus was found which caused death of mice by blood-poisoning inside of twenty-six hours.

FIG. 30.

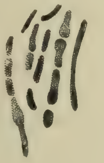


FIG. 31.

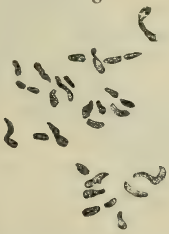
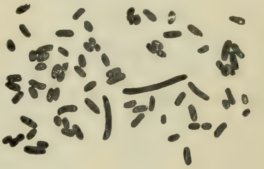


FIG. 32.



A cover-glass preparation of this micro-organism is represented in Fig. 32, after the photogram, 1000 : 1.

3. Incisor, with a large, ill-fitting cement filling. The pulp underneath not quite exposed, but in a purulent condition, *without smell.* The culture revealed very large, rapidly growing, blue-gray colonies, that may attain a diameter of five mm. in twenty-four hours. Short bacilli with rounded ends 0.1 ccm. of a bouillon culture one day old, or 0.1 of the condensation liquid of an agar culture, injected subcutaneously or into the peritoneal cavity of mice, caused death within thirty hours. Numerous bacilli in the blood.

It is very striking that these three cases, out of more than two hundred, should all have occurred on teeth which had formerly been filled. It would be an important question, which I have not as yet had time to investigate, how these three species of bacilli would affect other animal organisms, and whether they might have played a rôle in the various cases of death resulting from dental diseases which are from time to time reported.

2. THE MICROCOCCI OF THE DENTAL PULP.

a. Growing on Gelatin.

Whether a bacterium grows on gelatin or not, depends upon the composition of the latter and upon the temperature at which the cultures are kept.

Furthermore, many bacteria seem to possess the power of adapting themselves to artificial culture-media. In fact, nearly all of my cultures seem to grow better on gelatin now than they did formerly, and many which at first showed no growth gave very good cultures on gelatin after having been cultivated for a number of generations on glycerin-agar. It may be that the gelatin now in use has a slightly different composition or reaction from that formerly employed, but undoubtedly the chief reason for the better growth of the bacteria is their power of accommodation.

The growth of micro-organisms upon gelatin depends, accordingly, upon the composition and reaction of the gelatin, upon the temperature at which the cultures are kept, and finally upon the circumstance whether the bacterium has been previously cultivated upon other media or not.

I made use of the beef-water-peptone gelatin, containing 0.5 per cent. of common salt and ten per cent. of gelatin. It was kept at a temperature ranging from 21° to 23° C.

α. Micrococci which Liquefy the Gelatin.

I obtained micrococci that liquefy the gelatin from four different pulps: Nos. 16, 30, 31, and 49. Further examination of the cultures showed in Cases 16 and 30 Staphylococcus pyogenes albus; in Cases 31 and 49 Staphylococcus pyogenes aureus. No. 31 was the case of an incisor which had been treated six years previously and the root-canal filled with iodoform cotton. There was still a strong smell of iodoform. The tooth had been perfectly quiet for six years. An attack of dull pain in the evening caused the patient to consult me on the following morning, when I found an accumulation of pus about the apex of the root. The culture yielded Staphylococcus pyogenes aureus and another species of cocci to be described below. In Case 49 there was a profuse accumulation of pus about the root of an upper incisor, with considerable œdema of the lips. The culture showed the presence of Staphylococcus pyogenes aureus alone.

β. Non-liquefying Species of Micrococci.

Among the species of micrococci that grow upon gelatin without liquefying it, I mention as the first, but by no means most important: Streptococcus pyogenes. In the fifty cases under consideration there grew only four times a coccus that developed cultures which appeared in every way so similar to cultures of undoubted Streptococcus pyogenes, planted at the same time, that I felt justified in pronouncing them identical.

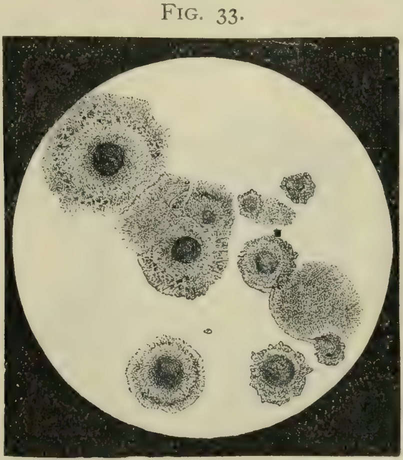
The chief importance is to be attached to a species of micrococci, or to a group of nearly allied species frequently met with in diseased pulps. I have, however, not as yet been able to determine whether we here have to do with one species or with several nearly allied species.

It is very well known to every bacteriologist how difficult it may be to establish the identity or non-identity of two species of micrococci. Even the question as to whether Streptococcus pyogenes and Streptococcus erysipelatis are identical is still differently answered by different authorities, although it has been a subject of constant investigation for the last ten years.

It will therefore be readily understood that when it comes to settling the relationship between several species, any one who is not able to devote his whole time to the work will find it simply impossible to arrive at a definite conclusion. Consequently, it must be left for future investigation to determine whether the forms now to be described belong to one species or to a group of nearly allied species.

In Figs. 33 and 34 I have reproduced two of the different forms in which cultures on glycerin-agar appear. Line cultures on the surface of the agar appear after one to two days as if strewn over with quite small, very bright glass beads, intermixed with larger, flat gray or bluish-gray colonies. The bead-like colonies scarcely attain a diameter of one mm.; the flat colonies are often two or more mm. in diameter. In some cultures only, or almost only, the former kind of colonies develops; in others we may find only the latter. It is sometimes impossible to determine that the flat colonies lie more superficially than the bead-like colonies. I think I may take for granted that the evaporation of the condensation liquid on the surface of the agar covers the young colonies with a thin layer of albumen, which offers great resistance to the spreading of the colonies on the surface.

FIG. 33.



Pure culture of micrococci from the pulp on glycerin-agar. 35:1.

The small colonies are often hard or cartilaginous; on trying to lift them with the platinum needle they slip along before the point. Under the microscope they appear very opaque, nearly black, while the flat colonies appear thin and colorless at the margin, with a round or star-shaped nucleus in the center; or the whole surface, near the middle, appears as if covered with particles of dust. Sometimes again these particles appear only toward the margin (Fig. 33). They show a more compact nucleus, and a border of a darker color with a greenish tinge. The border, which is highly refractive, is either continuous or consists of a number of nodes which possess a radiated structure. Where it is not present, the margin of the colony is very uneven. In other cultures the bead-like colonies are quite missing; we see only flat, bluish gray colonies that appear colorless under the microscope or faintly yellow toward the center. On gelatin this species grows in the shape of bright dots or of very thin blue colonies, that appear colorless under the microscope, with an uneven margin.

A second form of growth is seen in Fig. 34. Round, bluish to gray colonies, which reveal under the microscope a dense, dark, round center with a thin margin of various width. In the very large colonies the nucleus may be missing. We meet with various modifications of this nuclear form of colonies, while in older cultures, where the colonies do not lie closely together, very graceful and pretty shapes appear (Fig. 35).

The form of growth most frequently observed shows the following characteristics:

The colonies grow rapidly on agar, and attain their height in three days, when they may reach two mm. in diameter. *The young colonies are often intensely blue, later they become bluish gray to gray*, but do not, in this respect, always act alike. The large ones frequently possess a whitish center and a transparent rim.

FIG. 34.

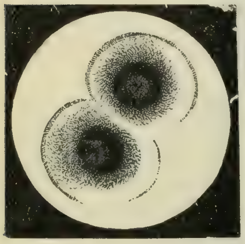


FIG. 35.

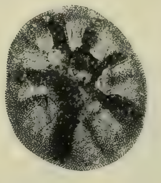
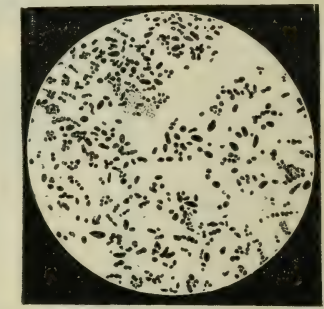


FIG. 36.



Cover-glass preparation of micrococci from the pulp. After the photogram. 1000:1.

Under the microscope the colonies look gray or colorless; sometimes the center is of a yellowish tinge. The surface appears partly homogeneous, partly as if strewn with few to very many dust-particles; margin smooth, or furnished with very flat indentations or short loops.

In Figs. 36–39 we have the appearance of a cover-glass preparation under one thousand diameters; small cocci and diplococci, almost always singly, only exceptionally in short chains of two to six links, with numerous large olive-shaped involution forms.

These are the morphological characteristics that we meet with repeatedly in the groups of cocci which we are at present considering. Sometimes the cocci may appear a little larger, another time a little plumper. Other small variations may also occur (Figs. 40–43); but these differences are not such as could not be easily explained by some slight change in the conditions of growth.

Sometimes, without apparent reason, the involution forms are so large and numerous that the cocci are forced quite into the background (Figs. 44–47).

Cover-glass preparations from cultures on agar only exceptionally show chains. At times, under a power of about two hundred and fifty diameters, short loops are observed on the margin of the colonies, that appear like streptococci. In bouillon cultures chains appear oftener.

The question repeatedly recurs to me, whether in these cultures we are not, after all, concerned with Streptococcus pyogenes? I still incline to the view, however, that such is not the case. The appearance of the cultures on agar cannot be said to be typical for Streptococcus pyogenes. In the second place, the scarcity of chains in the cultures on agar, as well as in the pus of tooth-pulps, does not seem to warrant the conclusion that we have to do with a streptococcus, although, in liquid cultures, chains are very often found.

FIG. 37.

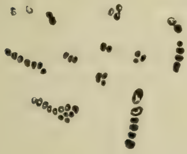


FIG. 38.

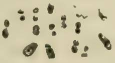


FIG. 39.

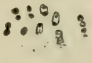


FIG. 40.

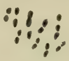


FIG. 41.

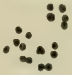


FIG. 42.

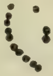


FIG. 43.

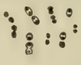
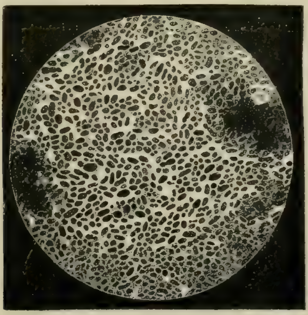


FIG 44.



Cover-glass preparation from an older culture of the coccus seen in Fig. 36. Predominance of involution forms. After the photogram. 1000 : 1.

The micro-organisms of this group appear to have considerable tenacity of life. Cultures on gelatin from twelve different pulps were all found to be alive at the expiration of ten weeks.

FIG. 45.

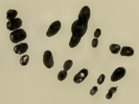


FIG. 46.

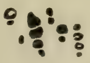
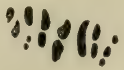


FIG. 47.



I have, furthermore, in five cases (11, 36, 37, 42, and 45), obtained cultures of a coccus that grows in large white or gray-white colonies with a luster very much like mother of pearl; under the microscope, roundish steel-gray colonies without sharp contour. They sometimes have a scalloped border, and are brownish-yellow toward the center;

cocci and diplococci of various sizes, some of them strikingly large (Figs. 48 and 49). I did not study them more closely, as they only appeared in small numbers.

From Case 9 I obtained delicate gray colonies of large barrel-shaped cocci.

In one case, there grew isolated colonies of sarcina; in another case I found Micrococcus tetragenus in the blood of a mouse that had died of a mixed infection from a suppurating pulp. In two cases I observed isolated large white colonies with a yellowish center and of very tough consistency, and three times I found about a dozen large grayish-white colonies that grew well on gelatin and had a leathery consistency. Large, roundish cocci.

Furthermore, there grew in pulp 19 about one thousand rather large, grayish-blue, round colonies that appeared colorless under the microscope, or faintly yellow, with a finely granulated surface and indistinct contour. Oblong, pointed cocci, singly or in pairs (Fig. 50).

Lastly, I obtained from pulp 49, beside the usual bluish-gray colonies, some large, semi-transparent, yellowish colonies, which are made conspicuous by their cartilaginous nature. In respect to its morphology, this bacterium also shows characteristic shapes, of which a representation is given in Fig. 51.

FIG. 48.

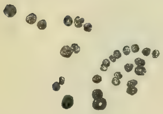


FIG. 49.

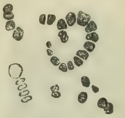


FIG. 50.

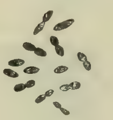
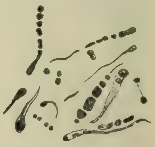


FIG. 51.



b. Micrococci that do not Grow on Gelatin.

The oftener I transplanted my cultures, the smaller became the number that showed no development on gelatin.

At the present time there are, among those cultures that grow on gelatin, eight that formerly were looked upon as not growing on that medium. Probably the reason for this is to be sought in a gradual adaptation of the bacteria to artificial media, as has already been observed and described concerning other bacteria.

The cultures of micrococci that up to the present have shown no disposition to grow on gelatin were obtained from pulps 2, 4, 13, 15, 18, 45, and 46. Cultures of these on agar, where the colonies are grouped closely together, appear in transmitted light on an opaque background, as if composed of innumerable small, dull glass beads; where the colonies have run together into a continuous ridge, the latter is distinctly blue; where they lie isolated, they attain a diameter of one and a half mm., appear more grayish, opaque, and lose their beady appearance.

Under the microscope the large colonies show a dense round or star-shaped nucleus of yellowish color, with a lighter, less dense, nearly homogeneous margin without sharp contour. The center of the colony is often spotted, and distinctly separated from the marginal zone. Isolated colonies sometimes take on the shape represented in Fig. 35.

The small colonies have often, under the microscope, a greenish tinge and a radiated structure. They adhere with difficulty to the cover-glass.

These cultures consequently present a striking similarity to those of the groups growing on gelatin and described above. Morphologically they show a no less striking similarity. I am consequently in doubt whether we have not to do with cultures of the same species which have been prevented, by some chance or other, from growing on the gelatin.

I have not been able to find a micro-organism which I could designate as the micrococcus of sputum-septicæmia (pneumococcus), although I have hunted for it diligently. In the last three years I have, in more than one hundred cases, infected mice with pieces of putrid and suppurating pulps in skin-pockets; in more than twenty cases I have made emulsions of such pulps in sterilized water, and injected them subcutaneously or into the abdominal cavity of mice; and in the third place, in about thirty cases I infected mice with the liquid of condensation of agar cultures, two to three days old, made directly from the pulp. In not one of these cases did the mouse die of real sputum-septicæmia. Particularly in consequence of the last-named experiments, I have been forced to exclude the pneumococcus from the list of pulp-bacteria, since an agar culture, two days old, of the pneumococcus, obtained directly from the tissues of the human body, is invariably fatal to white mice, whether injected subcutaneously or into the pleural or peritoneal cavities.

On this point my results differ from those of Schreier, who, in the *Oesterreichisch-Ungarische Vierteljahrsschrift für Zahnärzte*, 1893, Heft II, made a communication well worth reading concerning the etiology and pathogenesis of periostitis dentalis. Schreier found the Diplococcus pneumoniæ fifteen times in twenty cases,—*i.e.*, in seventy-five per cent.,—while I did not find it once. Of course I do not mean to assert that my results alone are correct, but the significance of my many experiments on mice cannot be denied. Furthermore, the observations which led Schreier to the diagnosis of Diplococcus pneumoniæ seem to me to speak rather against than for it. He infected two mice with a culture (second generation) in bouillon,—one of them in the pleural, the other in the peritoneal, cavity. The latter died in sixteen hours, the former remained alive.

In the blood and the scanty exudations of the abdominal cavity he found numerous round and oblong cocci in pairs and short chains; capsules were wanting. There are three points to be emphasized in these data: 1. Death with cocci in the blood speaks neither for nor against Diplococcus pneumoniæ, since other micrococci of the mouth—for example, Streptococcus dentinalis Dellevie—kill mice under exactly the same symptoms. 2. Death of only one of the two mice speaks rather *against* Diplococcus pneumoniæ. 3. Absence of capsules speaks directly against that micro-organism.

I have also often noticed the appearances in the growth of the colonies emphasized by Schreier, a white center and a very delicate transparent rim. But this appearance is characteristic neither for bacteria of the tooth-pulp nor for Diplococcus pneumoniæ.

The facts adduced by Schreier, that cultures nineteen to twenty-three days old, kept at room temperature, developed without exception when planted upon agar, certainly does not speak for pneumococcus, if not directly against it.

Pneumococci from the blood of a mouse, planted on glycerin-agar, thrive rapidly at blood temperature; the colonies attain a considerable size in twenty-four hours, after which time they do not grow much more. After twenty-four hours they resemble dewdrops (Fränkel), or look rather more like thin starch paste,—*i.e.*, they are usually not quite transparent, but somewhat clouded. After another twenty-four hours the colonies look flatter, as if they had begun to dry out. After three days they often show a halo and a transparent nucleus.

Pathogenesis of the Pulp-Bacteria.

There are, then, as I have already pointed out, different species of bacteria in the diseased pulp that have not yet been cultivated on artificial media, and of whose pathogenesis we know nothing definite.

Their great numbers in some pulps, and especially the repeated occurrence of spirochætes, justify the supposition that, under certain circumstances, they may play an important rôle in suppurative processes. We have all the more reason for such a supposition from the fact that spirochætes and spirilla have also been found in almost pure culture in abscesses of the jaw of dental origin.

The pathogenesis of the specific pyogenic bacteria found in the pulp (Staphylococcus pyogenes and Streptococcus pyogenes) is well known, and need not be dwelt upon here. The other forms which I have isolated, and particularly the group illustrated in Figs. 33–47, demand thorough consideration.

The pathogenic action of these bacteria was tested solely on white mice by subcutaneous or intraperitoneal injections of bouillon cultures or, more commonly, of the liquid of condensation of agar cultures. In a few cases the mice were inoculated in skin-pockets.

The subcutaneous injections proved to be the most satisfactory, for even pus-producing bacteria are often resorbed by the peritoneum without exhibiting any appreciable symptoms of disease.

1. *Bacilli.*

Reference has already been made to the slight reaction following the subcutaneous injection of pure cultures of the bacilli of the pulp.

A pyogenic action was observed only on the part of the bacillus illustrated in Fig. 28. In one case an injection of a pure culture of this bacillus was followed by the formation of a small abscess with white pus. In a second case a slight diffuse suppuration was produced.

Occasionally very small pus-centers, not much larger than the head of a pin, were observed as the result of an injection of considerable quantities of other pulp-bacilli.

In mixed infections of bacilli and cocci, the former do not, however, necessarily die. On the contrary, they sometimes seem to develop further, so that a certain pathogenic action on their part cannot be denied where they act together with cocci.

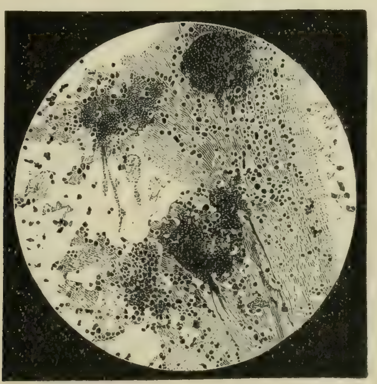
Three cases in which bacilli were found in the pulp, which caused death by blood-poisoning, have been described in detail above.

2. *Micrococci.*

The cultures of the micrococci of the pulp proved to be much more virulent than those of the bacilli.

The reaction did not, it is true, occur invariably, but in the majority of the subcutaneous injections in mice pus-centers from the size of a barleycorn to that of a pea were formed, in which the cocci could easily be seen under the microscope and obtained again in pure culture. Occasionally bean-sized pus-centers appeared, in others the suppuration was more diffuse. It occurred with sufficient constancy to prove that we here had to do with specifically pus-producing micro-organisms. For even the staphylococci and streptococci do not invariably produce suppuration ; on the contrary, the injections sometimes disappear entirely without causing the least disturbance. In a number of cases where a single large colony was taken from a plate of agar and introduced into a skin-pocket, a very similar result was produced.

FIG. 52.



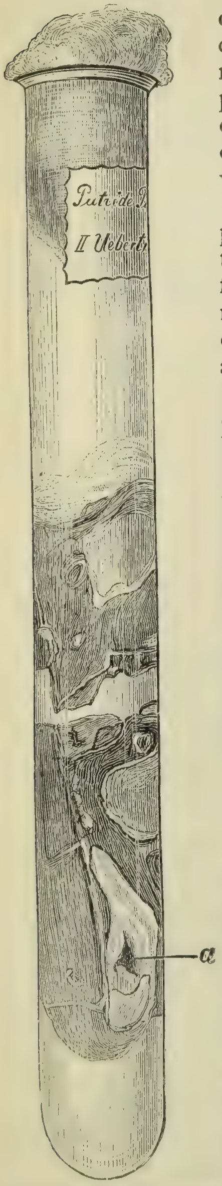
Cover-glass preparation from the pus of an abscess produced by a mixed infection from a diseased pulp. After the photogram. 1000 : 1.

If we vaccinate a mouse subcutaneously with a mixed culture from a putrid pulp, the operation will be followed by the formation of an abscess in the pus of which we find chiefly, or only, micrococci (Fig. 52). This result points to the conclusion, which we had already arrived at by other means, that the power to produce suppuration in the dental pulp adheres chiefly to the micrococci and not to the bacilli. There is, however, but little doubt that the infectious nature of the putrid pulp is intensified by the presence of the bacilli and the products which they may help to form.

EFFECT OF INCORPORATING PORTIONS OF PUTRID PULPS.

Bacteriological investigation has shown that large masses of living bacteria are by no means always present in putrid pulps. In fact, it frequently happens that in cultures from such pulps no development whatever takes place. This fact led Schreier to the conclusion that a putrid pulp in such cases must be a very harmless thing,—a view which is not supported by the results of experiments or by clinical experience. The virulence of putrid pulp-tissue does not depend alone upon the numbers of bacteria, but in a high degree also upon the products of putrefaction (ptomaines) present. I long ago called attention to the fact that portions of putrid pulps always act more intensely than portions of inflamed or suppurating pulps, and more intensely than pure cultures of bacteria from such pulps. These experimental results are readily confirmed by clinical experience, which has taught us that of all conditions of the diseased pulp none is so readily followed by evil consequences as that in which the pulp is converted into a stinking putrid mass.

FIG. 53.



Agar tube containing a piece of putrid pulp-tissue at *a*. Disruption of the agar by gas.

We have every reason to suppose that putrid pulps, even when free from bacteria,—*i.e.*, in which the bacteria have died for lack of nourishment, or from the action of their own poisonous products,—may produce inflammation and suppuration which, only if a single living germ be present, may assume a progressive character.

A putrid pulp which is absolutely free from living organisms is, however, probably never met with; but since, granted that the bacteria of the main body of the pulp may have died from lack of nutrition, those at the apical foramen might well be able to sustain life much longer by reason of the fact that a slight infiltration of the tissue of the pulp at the foramen must take place from the liquids of the surrounding tissue.

In abscesses produced by mixed inoculations with portions of putrid pulps, or with emulsions from such pulps, we regularly find a preponderance of micrococci both under the microscope and in the cultures.

PUTREFACTIVE PROCESSES IN THE DENTAL PULP.

We are all perfectly well acquainted with the fact that surprising quantities of foul-smelling products may be found in the decomposition of the dental pulp. This circumstance, however, admits of a ready explanation. When a small amount of organic matter, such as the pulp of the human tooth, putrefies in open air, the products of decomposition in a great measure become oxidized or are carried away by the movements of the air. In a closed pulp-chamber neither of these factors is in operation, so that gases and other bad-smelling products of putrefaction may accumulate in comparatively large quantities.

The odors developed by the pulp are, as is well known, of different kinds and vary greatly in intensity. They are determined on the one hand by the nature of the bacterium or bacteria present, and on the other by the stage of putrefaction. If the pulp-chamber is open so as to admit particles of food, particularly carbohydrates, we will have a mixture of putrid and sour smells. Where the apical foramen is large, and particularly where the wall of the root-canal has been broken through, the odor will be further modified by the decomposition of the ingressing serum.

Among the products of decomposition I have easily found ammonia and sulfuretted hydrogen. Undoubtedly a series of other products are present, of which we should expect in first line sulfid of ammonia, phosphoretted hydrogen, indol, skatol, etc.

If we bring a putrid pulp into a sterilized test-tube and fill over it with glycerin-agar, we shall observe in the following days a more or less marked development of gas by which the agar will usually be torn to pieces, as shown in Fig. 53.

If we hang a piece of moist lead-paper in such a tube, it will, if left for some time, turn black (H_2S), while a moistened strip of red litmus-paper will often turn blue (NH_3).

If we open the tube, we have no difficulty in convincing ourselves of the intensity of the putrefactive process present. The contents of such a tube, in particular the liquid which usually accumulates on the bottom, are very infectious.

FIG. 54.

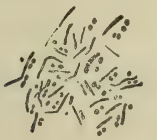
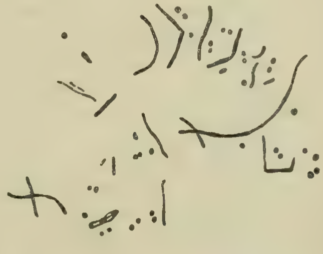


FIG. 55.



In order to determine what action the access or exclusion of air may have on the virulence of the products of putrefaction, the following experiments were made: A few drops of gelatin were placed in a test-tube, infected with a portion of a putrid pulp, and hardened in cold water. This was then covered with a column of agar; at first only a drop or two at a time was added, the tube being kept in cold water so as not to melt the gelatin.

In the control experiments the agar was first placed in the tube and a few drops of gelatin placed on top of it; this was then infected with a piece of the same pulp. In one case the gelatin was protected from the air, in the other the air had free access. Subcutaneous infections with cultures obtained in this way produced almost unexceptionally stronger reaction (more extensive suppuration) where the culture had developed under free access of air.

These results render it probable that, although bacteria may grow where the amount of oxygen present is exceedingly limited, as in a closed pulp-chamber, they develop better and attain greater virulence under access of air.

The question whether there is a specific bacterium of the putrid pulp was also made the subject of a few experiments. In Figs. 17–23 we have already made the acquaintance of the various forms of bacteria found in the putrid pulp. In Figs. 54–58 we have also the forms which were obtained when portions of putrid pulps were kept for a number of days in a column of agar at the temperature of 35–37° C.

We find,—

1. As a constant appearance small cocci and diplococci, very like those which we have established as the pyogenic cocci of the pulp (Figs. 54–57).

2. Somewhat less regularly slender, straight, or curved rods of various lengths which sometimes grow out into long threads (Figs. 54–55).

3. We often find also short rods with round ends, which are characterized by their bipolar staining.

In Fig. 56 we have a culture from a putrid pulp, showing the large involution forms which we have examined into above. (Compare Figs. 36–47.)

4. A species of micrococcus, which shows a great resemblance to Micrococcus tenuis, is occasionally met with (Fig. 57).

Fig. 56.

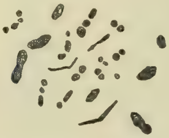


Fig. 57.

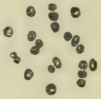
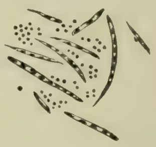


Fig. 58.



5. Long, pointed rods or threads which take up the coloring-matter in alternating zones (Fig. 58).

I obtained pure cultures of the forms referred to under 1, 2, 3, and 4. They all possess, in greater or less degree, the power of decomposing albuminous substances with development of putrid products. The chief rôle seems to be performed by the coccus described under 1. Further experiments are, however, necessary to furnish a definite solution of this question.

In regard to the last question placed at the beginning of this communication, Have we remedies at our disposal which are capable of rendering putrid pulps innocuous for the animal organisms? my experiments are not far enough advanced to justify me in presenting the results to the profession. This I hope to be able to do in a future paper.

IS PYORRHEA CURABLE?

BY J. ALLEN OSMUN, M.D.S., NEWARK, N. J.

(Read before the Dental Society of the State of New York, May 9, 1894.)

THIS is an important question, and on its solution depend the usefulness and preservation of many teeth that have been and are being rendered useless to their possessors. It has been claimed that as many teeth are lost from this cause alone as from caries. Whether or not this is too high an estimate, the fact is that many cases seem to resist every effort toward their amelioration.

In endeavoring to obtain a correct answer to this important question, it will be necessary to take into careful consideration the constitutional tendencies of the individual, as well as the physiological aspects involved, also the predisposing and exciting causes present, in order to form a correct basis for a satisfactory prognosis.

First, then, what as to terminology? I mean to include under the name of pyorrhea all those different symptoms which have received so many designations,—such as gingivitis or phagedenic pericementitis, and calcic pericementitis, by Dr. Black; or the more recently coined terms of Professor Peirce, as ptyalogenic calcic pericementitis, expressing the idea that it is local, peripheral, and salivary, and that designated as hematogenic calcic pericementitis, expressing the idea that in its origin it is constitutional, central, and associated with some modification of the normal composition of the blood-plasma; or the more common forms of expression used, such as proceed from the deposition of calcic tartar or serumal tartar,—as well as that peculiar condition when a pocket is formed, the removal of part or all of the alveolus, and no deposit found at all; and yet I do not mean those simple irritations of the gum-tissue which are amenable to simple treatment, and have often, I fear, been diagnosed as pyorrhea, and which have no resemblance to the disease under consideration.

In the various articles that from time to time have appeared, the line of argument presented has borne evidences of regarding it as purely a local lesion, and the line of treatment has been laid out on such premises. For a clearer conception of our subject let us look into the question a little closer. It is an admitted fact that the alveolus is a tissue which comes with the formation and the eruption of the teeth; that it is built up around the teeth both in the temporary as well as in the permanent set. From Tomes's "Dental Anatomy," page 198, quoted in Dr. Peirce's article in the "American System of Dentistry," we find the following language in regard to the formation of the alveolar process: "They were first built up as crypts with overhanging edges inclosing the temporary teeth; then they were swept away in great part to allow of the eruption of the temporary teeth; and next they were rebuilt about the necks to form the sockets of the deciduous teeth. Once more, at the fall of the deciduous teeth, the alveoli are swept away, the crypts of the permanent teeth are widely opened, and the permanent teeth come down through gaping orifices. When they have done so, the bone is reformed so as to closely embrace their necks. . . .

"It is impossible to insist too strongly upon this fact, that the sockets grow up with and are molded around the teeth as the latter elongate.

"Teeth do not come down and take possession of sockets more or less ready-made and pre-existent, but the socket is subservient to the position of the tooth. Wherever the tooth may chance to get to, there its socket will be built up around it."

The point I wish to emphasize by this quotation is that the alveolar process is a variable structure, prone to absorption, and that it is also a physiological procedure; and it must be admitted that if no lesion is manifested, no irritation present, sooner or later the entire removal of the alveolus will take place; that it is coincident with the elongation of the rami and the inferior maxilla and the advance of years, and, this being a fact, the teeth will be lost. What induces this retrograde condition, which we designate as "physiological absorption,'' is a question difficult of solution. The line of demarcation between the physiological and pathological is, however, well marked. Yet the physiological tendency must not be overlooked when making a diagnosis or predicting a successful prognosis.

The different phases, then, of that pathological condition which by common consent has been recognized by the term of pyorrhea alveolaris, are merely an incident, an attendant; and by its severity or mildness, by the careful or careless habits of the individual, or by the hereditary tendencies and the physical condition of the patient, the end is hastened or retarded.

The position taken and maintained by many writers,—whether necrosis of the alveoli is present, or if the removal of the socket is caused by an active absorption,—to my mind, is only one of degree. To explain: there cannot be an absorption, either active or passive, until the cell is dead, be it one or many; there cannot be necrosis until the same thing takes place. In the one case the process is slow, in the other rapid; and hence, when we find a large mass of bone exfoliating, having been cut off from its supply of nourishment, with the conditions present such as odor, pus, tumefaction, and in many cases hypertrophied flesh, with impaired nutrition of adjacent parts, we term it necrosis. While in pyorrhea we do not have the large mass of bone thrown off, we do have all the essential features of caries of bone-tissue, viz, death of the cell, and its removal by absorption. Is it not the same phenomenon, only accentuated in the one case over the other? To my mind this is an essential factor in our diagnosis, which should lead us to exercise great care in operative interference that we do not remove living tissue in an effort to get clear of foreign matter.

Now let us for a moment consider a few of the predisposing causes coincident with this disease, which has had so many names given to it. In the first place, we must not forget the strong tendency of Nature to repeat herself; and this law of heredity is a most essential factor in our diagnosis, and must not be overlooked. We find, therefore, that where a family history shows this disease as an inheritance from generation to generation, we will find it more difficult to handle, and the disease reasserting itself after the most careful and painstaking effort on our part and the intelligent co-operation of the patient. We always should inquire into the family history of each new case presenting itself for treatment. If we do so, perhaps we shall save ourselves some disappointment in giving our opinion as to the successful issue of treatment.

Then, again, constitutional disturbances are not to be overlooked. The position taken by Professor Peirce in his admirable article on this subject brings out in strong light the importance of a careful consideration of the uric-acid diathesis. Yet I have seen patients with scarcely a local trace of pyorrhea, and yet great sufferers from uric-acid poisoning.

This uric-acid theory is a condition in which the fluids of the body are saturated with nitrogenized waste in the form of lithic or uric acid, which is accompanied by such symptoms as dyspepsia, various nervous phenomena, muscular and articular pains, and associated with scanty, high-colored acid urine. The prominent causes are high living, little exercise, imperfect digestion of nitrogenized food, and impaired elimination of uric acid. If this is a correct statement of uric-acid poisoning, I fail to attach importance to this as a very great factor in the causes that are to be held responsible for this disease we have under consideration.

Now, granting, for argument's sake, that the uric-acid theory is correct, to what extent should we, as dentists, undertake to combat it by treatment, in order to ameliorate this pathological condition we have under discussion?

First, then, when we find an accumulation of serumal tartar, with symptoms of gout, or rheumatism, it would be a wise thing to have a urine-analysis made,—which, by the way, does not always show the presence of uric acid, this product often being deposited in the various tissues of the body instead of being eliminated by the kidneys; but if we do suspect it, we can do one of two things: either refer the case to the family physician for constitutional treatment and a report of the condition of things, or we can place the patient on "piperazine," which is perhaps the best uric-acid solvent now known. This remedy has no toxic or corroding effect, and can be taken for any length of time without disarranging the digestion or any vital organ. A solution of piperazine in cold water will dissolve twelve times as much uric acid as the same quantity of lithium carbonate. One other important item is, that piperazine always forms a neutral salt, no matter how long it is administered, or in what quantities, which makes it an exceedingly safe thing to use.

After the administration of this drug for a time, a urine-analysis should be made, which will show beyond the possibility of a doubt the presence of uric acid; if this be found, the patient should be placed conjointly under the care of the family physician and dentist. Thus, by attacking the disease from both a constitutional and local standpoint, the pyorrhea can be better controlled, and made more amenable to treatment. I merely mention in passing that piperazine is soluble in cold water to almost any extent, and a good prescription is as follows:

℞—Piperazine (Schering's), gr. v;
Solve in aqua, ℥ v.
Sig.—Tablespoonful in glass of Vichy two or three times a day.

These facts only emphasize the difficulty we have in diagnosing and finding the causes that lie hidden back of those local manifestations that are so familiar to us all. We must also not overlook the general health, or conditions such as phthisis, Bright's disease, or any disease which saps the vital forces, each condition contributing to aid and accelerate this affection.

We all know that a certain type of teeth seem to possess predisposing tendencies. Those hard, dense teeth which scarcely ever require any operative service, and which at the age of, say, thirty-five are perfect so far as caries is concerned, seem at a later age to develop this disease and resist most strenuously all efforts for their retention.

Now let us for a moment consider some of the exciting causes. A case presents itself. We find on examination an accumulation of tartar, calcareous, impinging the gum-tissue, little or no pus, no pockets; the simple removal of this substance will in a few days cause the entire mouth to present a healthful appearance,—this accomplished without any medication. What do we find in such cases as we watch them from year to year? Do we not find a gradual recession of the gum-tissue, caused by the absorption of the alveoli? Is not this the condition, more or less marked, in very many of the cases which are called pyorrhea? And do not these cases make up a large proportion of the cases that are labeled cured?

Let us take another type of a case presenting itself. Pressure on the gums causes an exudation of pus. On exploration we find a pocket of greater or less depth, and on a close examination we find the alveoli absorbed or necrosed,—which? The cold fact is that you find it irregular on its edge, one side more so than the remainder of the margin; and you find it granular, don't you? Not a large mass, as though a fracture of the jaw had taken place and a piece of bony tissue was being thrown off, but nevertheless of the same general characteristics. We find also a degenerated condition of surrounding tissue,—purple, tumefied, sore, inflamed, and altogether unhealthful. Now, after treatment, what is the result? Is it cured? Don't we find that if we manipulate carefully, removing all foreign substances whether calcareous or serumal in their composition, cleanse the pockets thoroughly, stimulate the parts often, after a while we may get a good result? The pockets are partially or entirely obliterated, the gums assume a healthful appearance, the pus is no longer present, and the case is dismissed as cured. *Is it?* See this same case six months later, and what are the conditions? Pus and more deposit; more absorption of the alveoli; in other words, the same conditions as before, and if not, tending right along in that direction and at a lively rate. Is not this the brief history of the majority—and a big majority at that—of the many cases?

The fact is, gentlemen, we have "conditions and not theories" to confront us. Right here we might digress for a moment and look into the causes that lie back of this tendency, in some persons, of secreting tartar in such enormous quantities. We have all seen patients who seem to have a "lime-factory," so rapidly does this substance collect; and in giving our prognosis of this condition, which we are pleased to recognize under the head of "pyorrhea," this peculiarity in the patient must not be lost sight of, as it has an important bearing in the case.

This, then, brings us to classify, as exciting causes, uncleanliness as the prime factor, the deposition of foreign substances on the teeth, either calcareous tartar from the saliva, or serumal taken from the blood. Can these causes be eradicated or controlled? Yes, and no. Cleanliness can be promoted, and by care to a certain extent control of the deposit of tartar if calcareous, but not entirely if serumal. It is doubtful if it can be checked by this method to any appreciable extent. The derangement of the saliva by any cause is also an exciting cause, but for our purpose it need not occupy our attention at any length, as this is usually of but short duration. Excessive medication by peculiar remedies has also a bearing on the case; but our real causes lie farther back, and if we have no constitutional disturbances, these last two causes play an unimportant part in the premises.

In view of these facts, which are so inadequately presented, we are brought face to face with the question of this paper, "Is pyorrhea curable?'' and I must answer ''No,'' not in the sense of removing the cause, of thoroughly eradicating it; but that the disease can be controlled, ''Yes,'' if perseverance, cleanliness, and *obedience* are observed by the patient, with fidelity and skill and conscientious care by the dentist; not otherwise.

How can this be secured? This brings us to the method and means pursued in our treatment of this lesion. Two principles are to be observed and, if possible, attained to,—viz, cleanliness and stimulation. How to obtain the first requisite is not so easy a matter as some writers have seemed to imply. The calcareous deposit is generally easily removed, and we need not stop to enter into any details. The tartar which we term serumal, and which is secreted deep under the tissue in a narrow pocket, and of tenacious hold upon the cementum, makes it often a tedious, painful, and difficult operation to successfully remove it entirely. Care must be also exercised not to wound the adjacent tissues, also not to impinge upon the alveoli, which at the best is a tissue of low vitality, and does not bear surgical interference very well. Methods vary according to the operator. Suffice it to say that by some means a thorough removal must be accomplished. Having done this, we stimulate the parts to get a healthy reaction. Various remedies have been suggested and used, with varying results. For years I used aromatic sulfuric acid in different dilutions, with extremely gratifying results. Latterly I have used trichloracetic acid, pyrozone in different strengths, mercury bichlorid, and hydrogen peroxid; also the so-called Robinson's remedy. I do not attach as much importance to the drugs as some do; any stimulating, cleansing germicide, if thorough removal of the irritating exciting cause is accomplished, will be found beneficial.

When we get to this point we generally consider the case cured, with an idea that we have done our whole duty. Have we? I think I am safe in assuming that we have only half done our duty to the patient. First, then, we should frankly state, if we believe it,—and I do,—that this condition is not curable; that the best we can hope to do is to so control it that by care and fidelity on their part the teeth can be made useful for years, more or less; that they must give attention to the time set for their appearance for treatment, which varies in different cases from one month to six months, according to the severity of the case and predisposition of the individual. So much for the patient. On our part we must have sufficient interest in this disease to give it that careful attention that we would to the most difficult gold filling, or to a crown piece, which I am inclined to think but few operators do; in fact, in many cases they do not give this class of cases any, or but little, attention at all; and when we have given the attention which to my mind it deserves, then charge a fee commensurate with the skill and time it demands.

The dental profession have educated the public up to a point of appreciation of very many operations undreamed of a few years ago, and we can do the same in this instance if we thoroughly believe in its importance. I leave these thoughts with you. They are fragmentary, I admit, but nevertheless based upon my observation.

PYORRHEA ALVEOLARIS.

BY W. XAVIER SUDDUTH, M.A., M.D., D.D.S.,

DEAN OF THE COLLEGE OF DENTISTRY OF THE UNIVERSITY OF MINNESOTA.

(Read before the Minneapolis Dental Society, Wednesday, May 16, 1894.)

IT has been said that there are only three strictly dental diseases: decay, alveolo-dental abscess, and pyorrhea alveolaris. The pathology, etiology, and treatment of the first two have been very definitely settled, but from the discussion that has prevailed during the past winter it would seem that pyorrhea is still a *terra incognita* to many practitioners. The varied terminology that has been used in discussing the subject expresses the condition of knowledge regarding it only too plainly. After careful consideration, I have decided to retain the term *pyorrhea alveolaris* because it expresses a common termination of all the several forms of inflammation of the peridental membrane, unless the disease is cured in some of its earlier stages. This is in keeping with the use of the term alveolar abscess, which, strictly speaking, represents only the suppurative stage of a peridental inflammation related to the apical portion of the tooth. It is true that the term might, as Dr. Black says, be applied to alveolar abscess as well, but the distinction between the two conditions is so firmly fixed in the mind of the general practitioner that there need be little fear of confusion. Then, again, the profession does not seem to take kindly to the many other terms that have been proposed: "Expulsive gingivitis," as used in 1860; "Riggs's disease," in 1869; "alveolar periostitis," in 1882; and "phagedenic pericementitis," in 1885, etc. If we were to favor any change in nomenclature, it would be to adopt the term Riggs's disease, out of gratitude to Dr. J. M. Riggs, of Hartford, Conn., who first recognized the condition. While it is true that he looked upon the disease as the result of mechanical irritation only, yet he gave clinics and taught his methods of treatment freely. At a meeting of the Connecticut Valley Dental Association, held in Greenfield, Mass., June 10 and 11, 1869, reported in the DENTAL COSMOS, vol. xi, page 412, Dr. Riggs stated "that for twenty-five years past he had treated this condition of disease in the alveolar process and gums with marked success, and referred to a clinic held by him at Northampton, two years before, on the teeth of Dr. Goodrich." It is only fair to give Dr. Riggs credit for recognizing the phenomena and successfully meeting the indications for treatment as well as can be done, from an operative standpoint, even at this day. That this line of treatment, however, does not meet all the indications is now fully recognized, and is my excuse for the presentation of a paper on the subject at the present time.

In an article on dental pathology and therapeutics in *The Annual of the Universal Medical Sciences*, written in 1887 and published in the early part of 1888, vol. iii, pages 465–6, the present writer, in discussing the subject of pyorrhea, took the stand that it was "the secondary stage of a disease that has its inception in a catarrhal stomatitis, being confined, as a rule, to the margins of the gums surrounding the teeth, and that it might be called a gingivitis were it not for the general catarrhal tendency shown by the entire mucous membrane of the mouth and nasal passages." We further held "that the intimate relationship between a general catarrhal idiosyncrasy and pyorrhea alveolaris was more than a mere coincidence ; that its common occurrence in the mouth of persons who have irregular teeth has also been noted, and has a direct bearing on the pathogeny of the disease ; that it is well known that irregularity of the teeth presents an indication of a degenerative taint, and that persons in whom irregularities occur are very prone to catarrhal affections of the respiratory organs." We called attention "to the offensive odor of the saliva of individuals who showed this particular tendency to catarrhal affections, even when the most scrupulous care was taken of the teeth." And, finally, we held "that in a majority of cases, pyorrhea is a form of stomatitis in which the local and constitutional factors in the production of the disease are largely dependent upon a hereditary dyscrasia for their ability to engraft themselves upon the tissues. That the pathogeny of pyorrhea may be explained in several ways ; the general causes are local or symptomatic, or both combined. That the most common cause is found in local irritation, combined with some hereditary disposition to catarrhal affections, while the next greatest etiological factor is symptomatic, the local expression of a constitutional vice."

By reference to lecture notes (prepared soon after the publication of the above, and delivered before the students of the College of Dentistry of the University of Iowa) the following additional data are discovered,—viz, "That the local disease is many times the local expression of a constitutional disease : catarrh of the fauces and nasal cavity, syphilis and its antidotes, tabes dorsalis, rheumatoid arthritis, gout, Bright's disease, tuberculosis and actinomycosis. That it is the common sequela of malarial fever and the eruptive fevers in young persons, also of general debility and injudicious habits of living," and, finally, as a complication of the disease in its secondary stages, there can be no doubt of the action of micro-organisms, yet we do not feel justified in conceding them, as some do, a position of specificity, and that we do not look upon pyorrhea as contagious, unless it is the result of syphilis. The case reported by Dr. Van Woert may have been specific in character.

After several years of study and teaching the subject, most of the time under the most favorable circumstances, in a large clinic where many cases present for treatment, we see no reason for changing the data above formulated as covering the pathology and etiology of the disease.

We have made many experiments in the laboratory looking toward discovering some pathogenic germ that would produce the disease, but so far without any success ; and while we are willing to admit that such may some day be discovered, yet the indications seem to be against it, as everything seems to point to its catarrhal origin, induced by conditions which are purely local in character or the local expression of some constitutional disease.

The fact that it is confined to man, except in cases where the animal is fed on food that partakes of the character and constituency of man's food, as in pet lap-dogs, horses and cows fed on malted grains and slops containing larger or smaller quantities of glucose or starch, leads to the opinion that food-stuffs play a more or less important part in the production of the disease.

The mucous membrane of the mouth is more or less constantly bathed in a mixed saliva, which is normally alkaline in character, yet which seldom or never is found so by reason of the fermentative action that is constantly going on in the oral cavity. When this takes place in the presence of glucose, lactic acid is produced in varying quantities, and mixes with the saliva and gives an acid reaction. The only acid found in the mouth, as given by Landois and Sterling, is lactic, derived from decomposition of grape-sugar. Grape-sugar is constantly found in the oral cavity, being produced by inversion of maltose, by the ferments constantly present. The maltose is most commonly the result of the diastatic action of the saliva on starch.

From a very careful line of tests pursued by the members of the senior class and the writer of this article in the pathological laboratory of the College of Dentistry of the University of Minnesota, the past winter, the following results were obtained:

Case I.—Patient, Mr. S., age forty. Good health, with the exception of slight dyspepsia, accompanied by eructation of gas within one or two hours after eating anything sweet. Took excellent care of mouth. Teeth and gums in good shape, with the exception of slight denudation of roots of inferior cuspids upon the labial faces. An examination of the saliva showed .027 gram lactic acid to every cubic centimeter of saliva.

Case II.—Mr. O., age twenty-three. Took most excellent care of mouth; teeth good, no cavities; used brush four times daily for past five years, with rubber ligature passed between the teeth after each meal, yet tests showed in his mouth .010 gram lactic acid to each c.c. of saliva in a series of tests kept up daily for two weeks, with no variation.

Case III.—Mr. W., age twenty-three. Took good ordinary care of his mouth; made a practice of brushing his teeth once daily, using an alkaline slightly antiseptic powder. Tests showed .014 gram lactic acid to each c.c. of saliva.

Case IV.—Mr. H. Used brush and ordinary care of teeth; all cavities filled. Tests showed .0202 gram lactic acid to each c.c. of saliva.

Case V.—Mr. M., age twenty-two. Took ordinary care of mouth; used brush once daily after breakfast; powder used, prepared chalk. First test showed .027 gram; the second day it showed .009. As nearly as could be found out, the patient failed to rinse the mouth before the first test, consequently it should not be used as a comparative test, as those made on succeeding days showed .009 gram lactic acid for each c.c. of saliva.

Case VI.—Mr. L., age thirty. Good strong teeth, healthy mouth; has used ordinary care in cleansing teeth,—brush, water, and powder. Tests showed .013, .009, .007, .001, .011, .013 gram lactic acid to each c.c. of saliva for one week. Patient has never suffered from dyspepsia, nor had a metallic taste in mouth. Has few cavities, and has only lost one third molar.

Case VII.—Mr. W., age twenty-one. Took good care of mouth. First test showed .016 gram lactic acid to each c.c. of saliva. With extraordinary care and use of antiseptics, this patient was able to reduce the acidity to .008, but found the day following the eating of some corn-starch pudding that the acidity returned to .0165, and the following day was reduced to .013 and the second day to .008. This circumstance was most fortunate, as it pointed out the fact of the relation of food to acidity very decidedly. The patient used the same care during the previous days, but despite his efforts the acidity increased and remained for three days. Other experiments made in the same line corroborate our previous observations on this point.

The test for lactic acid was made by taking a freshly prepared blue solution of ten c.c. of a four per cent. solution of carbolic acid with twenty c.c. of distilled water and one drop of liquor ferri perchloridi, which is changed to yellow by lactic acid (Uffelman). The quantitative tests were made by using phenol phthalein and a volumetric solution of sodium hydroxid .004 gram to the c.c. of distilled water, and lactic acid .009 gram to one c.c. distilled water. A quantity of saliva was collected after having rinsed out the mouth, and diluted with a definite quantity of distilled or boiled water. Then five drops of dilute tincture of phenol phthalein was added to ten c.c. of the diluted saliva, and the quantity of sodium hydroxid necessary to show the color of the phenol phthalein ascertained. Then a given quantity of the lactic acid solution was added, and if it decolorized the mixture the test was complete, and the quantity of lactic acid added represented the quantity in a given portion of the saliva.

Much depends upon the character of the food, as to the local condition around teeth. If much starchy or saccharine food is taken, mucilaginous candies or pastry, or even under-done yeast-bread, that adheres to the teeth, is used, a local condition of fermentation is developed, and the ligamentous attachment of the teeth destroyed by the catarrhal process set up by the irritating action of the lactic acid. When once pockets are formed, fermentation takes place in these, and the acid produced unites freely with the salts of calcium in the alveolar process, thus destroying it, and at the same time denuding the roots of the tooth of their pericementum, and exposing their surfaces by a further extension of the inflammatory action. These pockets, as a rule, form on the side of the root least accessible in cleansing, and spread around from this point. Sometimes they are quite narrow, and yet extend to the apex of the root. The destruction of bone is not a necrotic process, but is identical with decay of the teeth. The high potency of nascent lactic acid is well known. The basis-substance of the bone is destroyed by the same process as is found to produce decay of the teeth. The lime-salts are removed, and the organic matter left to be broken down by the suppurative process that supervenes from ingress of the infectious germs of the oral cavity.

One of the weakest points in the recent theory advanced by Dr. Peirce as to the beginning of the disease pyorrhea alveolaris at the apical portion of the root, is that he in no way attempts to account for the process of infection, or for the absorption of the alveolar process. The subject is dismissed in glittering generalities in language such as this : "The inflammatory state, with its concomitants, pus-formation and process-absorption, responds promptly to constitutional treatment and restriction in diet." Such treatment of scientific subjects will not do in this advanced era of pathology. Bone-absorption is not an accompaniment of an inflammatory process. Inflammation and pus-formation in bone lead to death by gangrene or necrosis, and sequestra are formed, and such have never been found to be the manner of loss of the alveolar process in pyorrhea alveolaris. Neither is it a carious process ; in fact, the bone is not diseased at all, because the removal of the offending tooth stops the process of absorption of the process, which would not be the case if it were a carious process located in the bones. Then, again, pus-formation is not necessarily an accompaniment of inflammation, unless germs find lodgment in the tissue thus affected, and whose vitality has been lowered by the disease-process. There must be a break in the continuity of mucous membrane of the gums, or else the germs must get to the apex of the root through the circulation. Uric acid is a powerful irritant, but it cannot produce a drop of pus. Once admit the possibility of infection from the oral cavity, and the force of the argument for the hæmic origin of the pyorrhea alveolaris is broken, because then the action of the urates of soda, if they are deposited in a previously healthy pericementum,—which we do not admit,—can only act as a predisposing cause to a pericementitis that extends to the gums, breaking up the ligamentous attachment and admitting the pus-germs from the oral cavity. The absorption of the alveolar process begins at its free borders ; and furthermore, previous to any loss of bone-tissue, there is first an accretion in the form of a *thickened border* or nodular development of the alveolar process, the result of deeper irritation resulting from the oral catarrh. These prodromous signs of pyorrhea have been noticed by several good pathologists, but have not, to my mind, been satisfactorily accounted for before.

As is well known, the disease is of a chronic nature, and has its fluctuations. The calculary deposits on the roots are laid down during the secondary stage of the disease, much as salts of calcium are deposited in other portions of the body, and not in its incipiency.

Symptomatology.—Regarding its symptomatology, little need be said, except to emphasize our own particular idea of its catarrhal nature. The profession has long been agreed on the general phenomena of the disease. The earliest stages of pyorrhea are seldom recognized by dentists as such, simply because they designate as pyorrhea alveolaris only the suppurative or secondary stage of the disease.

In idiopathic inflammation affecting the gums—and here again I quote from the *Annual of the Universal Medical Sciences*, vol. iv, 1888, p. 468—"little or no constitutional symptoms are present, owing to the peculiar character of the tissue in which the disease is located. The common features of inflammation are present, viz, redness, heat, pain (amounting to great tenderness in some instances), and swelling. The latter, however, is generally slight, because of the small cavity of the tissue for congestion, and hence the greater tenseness and consequent tenderness of the gums. In the symptomatic form of stomatitis there are present constitutional as well as localized symptoms, dependent upon the fact that the local disease is the result of a constitutional vice. In both varieties the quantity of saliva is markedly increased. This is also to be remarked in persons presenting a catarrhal tendency, even when no active catarrhal condition is present. The mucous membrane of the mouth, in such cases, has a juicy appearance. The salivary glands also seem to be more or less affected, and when stimulated by the rubber-dam will flood the operator with a perfect stream of saliva. The gums in these cases bleed upon the slightest touch, and the breath has a peculiar offensive odor.

More or less tartar collects around the teeth,—in many instances being of a serumic character,—the result of inflammatory action.'' In every instance, though the inflammation begins as a catarrhal inflammation in the oral cavity and extends to the gums and peridental membrane, the attachment of the teeth in their sockets is broken, and infection sets in from the saliva, establishing the condition known as pyorrhea alveolaris. If the infection comes from the apical portion of the tooth, as a result of death of the pulp, the condition is one of alveolar abscess, and not pyorrhea. In some isolated cases, pockets of pus are sometimes found in the alveoli at the junction of the roots, while the pulps are yet alive and the gums apparently firmly attached, which can only be accounted for on the ground that they have not always been so firmly adherent, or that infection came from some other portion of the body. I have in my cabinet a tooth, left superior first molar, extracted by Professor Bailey, where such a condition existed.

Having set forth thus briefly our ideas regarding the pathology of the disease, let us see how the several causes cited can be harmonized with its catarrhal nature.

Of the local irritants, salivary calculus, misfitting plates, lack of cleanliness from neglect or irregularity of teeth, pipe or cigarette smoking, or the inhalation of injurious gases, little need be said. These have been dwelt upon from time immemorial as causes of catarrhal stomatitis. Too much stress, however, cannot be laid upon the pernicious habit of wedging teeth for examination and gaining space for filling, and the most unnecessary practice of ligating the rubber-dam in place, especially by forcing the ligatures up under the gum, thereby breaking up the ligamentous attachment of the teeth and permitting infection from the saliva. Of the constitutional diseases, syphilis and tuberculosis, and the local disease actinomycosis, a passing remark only is necessary. They find their seat, many times, upon the gums, and lead to destruction of the attachment of the teeth, including absorption of the alveolar border. They are many times mistaken for pyorrhea, and, even if observed in their earlier stages, lead to a subsequent true condition of pyorrhea alveolaris. The well-known tendency of the eruptive fevers, such as measles and scarlet fever, to catarrhal complications in the oral cavity is too well known to need discussion in this article. So, also, the constitutional administration of mercury.

Mr. Bland Sutton is authority for the statement that permanent loss of the teeth is a very common feature of rheumatoid arthritis in animals, and has also been met with in mollities ossium and other wasting diseases.

Magitot, who views the alveolo-dental periosteum as a ligament, and not of the same nature as an osseous periosteum, calls the disease alveolo-arthritis, and mentions, especially, as causes, chronic Bright's disease and glycosuria, in which latter, he says, ''the phenomena are absolutely consistent.'' In rheumatoid arthritis, the disease begins and has all the signs of a rheumatic fever, with more or less severe inflammatory symptoms in the synovial membrane and ligaments, when these latter happen to be the pericemental attachments of the teeth. More or less soreness is observed, with subsequent breaking up of the attachment and infection from the saliva, the same as if the disease had begun in the mouth. In mollities, the same process of absorption and infection occurs. In chronic Bright's disease, there is a well-known tendency to acute inflammations of serous and mucous membranes, which latter occasionally find their seat in the peridental membrane, with all its accompanying phenomena. In glycosuria, the fermentation of the excess of saccharine matter in the secretions of the body gives rise to acute local catarrhs, the mucous membrane of the mouth not escaping; hence the direct connection of pyorrhea and glycosuria.

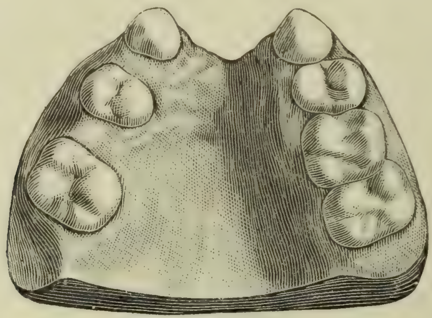
(To be continued.)

HARE-LIP WITHOUT CLEFT PALATE.

BY NORMAN W. KINGSLEY, D.D.S., NEW YORK, N. Y.

ON page 372 of the May number of the DENTAL COSMOS, in a paper read by Dr. Marshall before the Tennessee Dental Association, he says, "Fissures of the lip often occur without cleft of the velum or maxillary bones." On page 389 of the same journal, in a discussion upon the above-named paper, Dr. J. J. R. Patrick says, "We may have cleft palate without hare-lip, but never hare-lip without cleft palate."

FIG. 1.



I should be inclined to think that Dr. Patrick has been misreported were it not that his statement, following so close upon Dr. Marshall's paper, was evidently intended to be just what it reads.

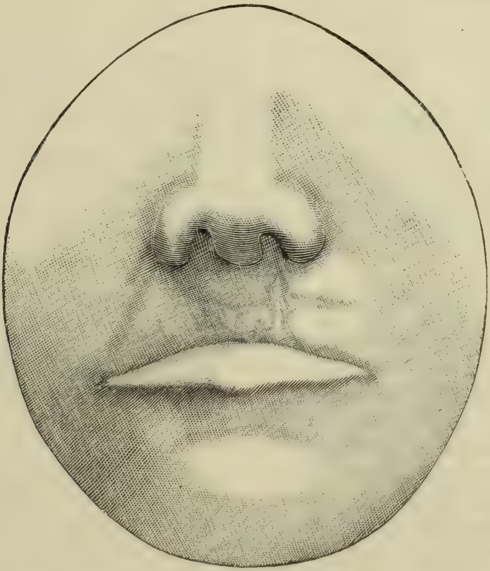
I am somewhat surprised that Dr. Patrick, with his extended observations, has never met a case of hare-lip wherewith there was no associated cleft palate. Such cases are not very uncommon, nor have they passed unnoticed by others who have written on the subject.

Fifty years ago I listened frequently to a very noted Methodist preacher who had a hare-lip but no cleft palate. He had a great reputation for oratory, and his enunciation was perfect. I have met with a number of similar cases since, but the most extraordinary one has recently come into my hands for treatment.

I am inclined to think that this one is very rare, for I read in a recent work on this subject by Mr. William Rose, F.R.C.S., London, that "in all cases of double alveolar cleft the palate is also involved," and it is quite possible that the one I am about to describe has no recorded precedent.

Fig. 1 represents the cast of the upper jaw of a girl eight years of age, and Fig. 2 a cast of the features immediately surrounding the mouth. At birth there was a double hare-lip, with the attachment, usual in such cases, of the intermaxillary bone hanging like a knob pendent to the vomer. *There was no fissure behind the alveolar arch.*

FIG. 2.



In operating for closure of the lip, the surgeon removed the intermaxillary bone, and the closure of the lip was effected with slight deformity.

The object of the child's visit to me was to supply the gap in front with artificial teeth ; and the first step was to widen the upper jaw, as it was so narrow that the upper teeth fell entirely within the range of the lower ones. For that purpose I made a vulcanite plate, filling the gap in front, and split it from the front toward the back, as shown in Fig. 3. When this became useless from overspreading, a second one was made of like character. The widening was accomplished solely

FIG. 3.

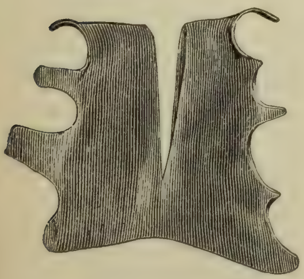
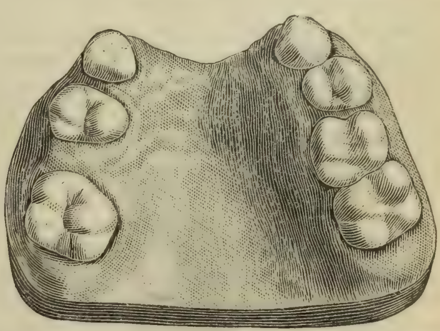


FIG. 4.



by the use of a bit of pine wood condensed and forced into the slit as a wedge. The expansion of this wedge by the moisture of the mouth produced the result as shown in Fig. 4. The space between the temporary cuspids was increased from ten-sixteenths to fourteen-sixteenths of an inch. The space was subsequently filled with artificial teeth. The child's speech has not been affected in the least by such an abnormality.

PROCEEDINGS OF DENTAL SOCIETIES.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

The annual meeting of the Dental Society of the State of New York was held in Albany, May 9 and 10, 1894.

At the morning session of May 9, after the reading of the president's address, Dr. R. Ottolengui read the

REPORT OF THE CORRESPONDENT.

MR. PRESIDENT AND GENTLEMEN,—As you have once more honored me by choosing me to be your correspondent, it becomes my duty to render you a report upon some point vital to our professional interest, gathering material therefor by means of correspondence with prominent practitioners.

Until very recently I could not determine upon any subject which promised to bring forth a discussion of great interest, but in the April number of the DENTAL COSMOS I found an article by that able writer and scientific investigator, Professor Miller, of Berlin, and this opened up a subject fraught with much importance to us all.

In the main, Professor Miller reports his experiments upon green-stain, and it is the following paragraph to which I wish to invite your most careful consideration :

"In reference to the green-stain of children's teeth, I have given more attention to this question, and after an examination of at least two hundred cases I have become convinced that the idea that green-stain is something that eats into the substance of the tooth has been much exaggerated. It always remains restricted to the enamel-cuticle, and does not encroach upon the enamel, every trace of the stain peeling off along with the enamel-cuticle when the tooth is acted upon by acids. Pits, fissures, grooves, or scratches on the surface of the tooth predispose to the deposition of the green-stains ; likewise a surface roughened by the action of acids. This has led some to suppose that the stain was the cause of the roughness, while, as a matter of fact, the sequence has been just the opposite."

The theory advanced in the above being totally at variance, so far as I have understood it, with all previously prevailing thought upon the subject, became at once immensely important in my mind.

There is no man in the profession to-day that admires Professor Miller more than I, for his painstaking and laborious investigations, which, more than the work of any other individual, perhaps, have tended to lift the practice of dentistry from empiricism into scientific methods. But it is exactly the theories of those in highest authority which should be most crucially criticised and catechised. This for the reason that, if unquestioned, they carry conviction to the rank and file, and, if erroneous, they work mischief. The sporadic theses from the pens of unknown writers, even though they advance dangerous doctrines, may be left unnoticed, for they will die in the grave of isolation. On the other hand, no amount of analytical questioning of the truth can do more or less than make the truth shine more effulgently. Therefore, in choosing the above quotation from Professor Miller's article, and sending it to leading men on this side of the Atlantic, I am sure that I but pay him a high compliment, even though in this report, as will appear, the result is not a coinciding with his expressed views.

I sent my query to twenty-five gentlemen of national reputation, of which number, I regret to say, only a few have replied. Upon this subject of green-stain, then, Dr. Edward C. Kirk says,—

"Replying to your inquiry as to the relationship between 'green-stain' and the decalcification so frequently noticed in connection with it, I have to say that I regard the relation as purely accidental, and in no sense as an expression of cause and effect. I take this view of the matter for the reason that, in my experience, decalcification of enamel under green-stain is by no means a constant condition, and on the other hand, decalcification of the enamel, at or near the gingival border, frequently takes place without any deposit of green-stain. From the fact that they can and do occur quite independently of each other, I regard the two processes as being of distinct origin, and their coincidence in certain cases as purely accidental.

"As to the other query,—viz, the cause of the enamel decalcification,—I regard it as one of the forms of enamel-erosion, a definitely localized variety, caused by a secretion of abnormal mucus from the glands at the gingival margin. As to why the glands in question should take on such an abnormal activity, I am not prepared to advance a theory. I only know from observation that any continued irritation to the mucous membrane, definitely localized, will in a short time produce an alteration of its function to the extent of causing it to secrete an acid fluid or mucus which has the power to decalcify the tooth-structure with which it comes into contact.

"The irritating effect of decomposing food-débris I believe to be an important factor in the decalcification in question, not so much by the local generation of acid which occurs as a result of the decomposition, but as a secondary effect from the irritation which the gingival mucous membrane suffers from contact with such food-débris."

Dr. John I. Hart says,—

"In my opinion the decalcification of enamel so commonly found associated with green-stain is due to the extreme acidity of the green deposit, and commences as simple chemical action."

Dr. G. V. Black writes,—

"I read Dr. Miller's article on green-stain, in the COSMOS, with care, and laid it aside with the feeling that he had left the subject about where he had found it; or, in other words, that the result of his labor had been negative. While he has added many facts to our knowledge by this investigation, they do not seem to affect the subject of green-stain in a positive way.

"I have no pronounced opinions upon this subject, but my feeling is rather in favor of the hypothesis with which Dr. Miller closes his subject,—*i.e.*, that green-stain is rather to be regarded as a frequent accompaniment than as a cause of chemical disintegration of enamel."

Dr. Frank French says,—

"In regard to green-stain, I have always considered that it caused decalcification of the enamel, but I have made no microscopical examinations. I do not think the green-stain is *all* in Nasmyth's membrane, or that it *all* comes away with the membrane, or that the disintegration was there before the membrane. The membrane was there when the tooth was erupted. There was no green-stain when erupted, neither was there decalcification of enamel, for it was covered and to a certain extent protected by the membrane; therefore the disintegration must have been caused by the action of the green-stain, through the membrane, upon the enamel.

"I think very highly of Dr. Miller and of his work, but do not entirely agree with him in this matter."

Professor James Truman sends the following:

"In Professor Miller's valuable paper in the April number of the DENTAL COSMOS this statement appears after an exhaustive review of the entire subject of stains, and especially green-stain, upon the teeth: 'After an examination of at least two hundred cases, I have become convinced that the idea that green-stain is something that eats into the substance of the tooth has been much exaggerated. It always remains restricted to the enamel-cuticle, and does not encroach upon the enamel, every trace of the stain peeling off along with the enamel-cuticle when the tooth is acted upon by acids. Pits, fissures, grooves, or scratches on the surface of the tooth predispose to the deposition of green-stain; likewise a surface roughened by the action of acids. This has led some to suppose that the stain was the cause of the roughness, while as a matter of fact the sequence has been just the opposite.'

"In answer to your query whether I sustain this view, I may reply that in the examination of teeth coated with the stain, in young persons, it has invariably been shown to be accompanied by decalcification. This has not been the case with teeth of maturity or middle life. This variation has led me to infer that either the deposit in later life was of a different character, or that the increased density of the teeth at this period gave a resisting power superior to the weak acidity generated by the agent supposed to produce it.

"I cannot find myself in accord with the idea that roughness must precede the deposit, or that the stain does 'not encroach upon the enamel' either directly or indirectly. That the enamel is softened or decalcified under it has been so clearly demonstrated by clinical observation in my experience, that I am forced to ascribe it either to the action of the stain or to an acid generated by contact with the lips during periods of rest, as at night, or from the acid of the mucous glands, as described by Dr. Kirk, during the same period.

"In the absence of positive tests, any antagonism to Professor Miller's views must be inconclusive; but as he affirms positively that this softening, or, as he expresses it, the 'roughness,' precedes the deposition, the assertion does not seem warranted by the facts as seen in this country at least.

"So universally has this softening of the enamel been present in my observation, that any attempt at removal of the stain has been accompanied always with some feeling of trepidation lest in disturbing this the outer surface of the enamel would be destroyed, and I fail to recall an instance where this was not measurably the result.

"The question whether this decalcification is a local pathological condition dependent on change of secretions from neutrality to acidity through the action of bacterial forms cannot be answered with our present knowledge, but practically the hypothesis seems to be sustained by experience that green-stain has a direct influence in the destruction of the enamel-prisms.

"If roughness precedes all deposits of green-stain, it would seem that all disturbance of the enamel on the labial surfaces of the anterior teeth should be followed by this deposit on persons from eight to fourteen, but that this is not the case is clearly demonstrated by the experience, it is presumed, of all operators.

"Surely acid action, of the character of erosion, yet devoid of one factor of that condition, is frequently observed in children's teeth with no appearance of coloration.

"The entire question, as I view it, still remains an unsolved problem; and until we have more conclusive investigations, speculation as to its origin is of but little scientific value."

Dr. Wm. Jarvie writes,—

"I have answered in condensed form the questions you ask, and would only premise that the answers are founded on the judgment formed after many years of experience and observation in the mouth, and not upon scientific experiment or research.

"Your first question is, Whether the altered condition of the enamel occurs first, and the deposit of the stain is a subsequent procedure.

"Your second question is, What is the cause of the decalcification of the enamel which is so commonly found associated with green-stain?

"My opinion is that the green-stain is formed first, and that either the stain itself or that which produced the stain is responsible for the disintegration of the enamel accompanying it.

"My reason for believing that the stain is formed first is, that I have seen it upon many teeth of dense structure upon which, after the removal of the stain, no disintegration was observed. And I have seen the stain upon teeth of delicate organization, and in the mouths of young people, which upon removal was found to cover disintegrated enamel. Now, if disintegration of enamel occurs first and the green-stain forms subsequently, we would always find disintegration of enamel upon the removal of the green-stain, however short a time the stain had existed and upon however hard tooth-structure, and this I think the observation of every one will not corroborate.

"I believe the green-stain to be caused by the decomposition and fermentation of organic matter, forming an acid, or causing the formation of microbes which exude an acid, and thus decomposing or dissolving the lime-salts in the enamel.

"It may be asked how it is possible for organic matter to remain long enough in contact with the prominent surfaces of the incisors to decompose or ferment, when the constant movement of the lips would prevent continuous presence for any length of time of any organic substance? It has been my observation in almost every case in which the green-stain has occurred, that little or no movement of the lips of these people ever takes place. Time and time again have I given patients for whom I had removed the green-stain, water to rinse the pumice from the mouth. After rinsing the mouth, I would examine the teeth and find little or none of the pumice removed. I have called their attention to this fact, and asked for intelligent effort to remove the pumice with water, and only after repeated effort have they succeeded.

"This has always seemed to me a solution of the cause of the presence of green-stain in the large majority of the cases in which it is present."

Dr. R. R. Andrews says,—

"I regret that I have no expert testimony to offer in regard to green-stain. General observation from my private practice leads me to believe that Professor Miller's views are correct."

Dr. Geo. S. Allan writes,—

"Dr. Miller's article interested me greatly, and the point you allude to attracted my attention at once, in that his conclusions were contrary to those I had generally accepted as being correct.

"Cause and effect, as I understand matters, he transposes ; and had any one else than Dr. Miller made the change, I should have said that guess-work had much to do with it.

"Even now I hesitate to accept the new positions of the horse and cart. My own opinion always has been that in some way the green-stain contained the cause of the subjacent decalcification and preceded it, and several marked cases that have come under my eye since reading the article confirm me in my position. One especially, where the stain shaded off gradually from a central dark spot, seemed very conclusive, for just in proportion to the depth of the stain the surface of the tooth was affected. I removed the stain very carefully, and found the decalcification underneath to bear a direct relation to its quantity and depth at the margins. Where the stain was least in quantity, and presumably most recent, there was no decalcification whatever. There were two well-marked cavities under the dark regions.

"The effect of Dr. Miller's views is simply to place me on the fence, and until I have had more time for thought and investigation I think I must stay there,—all because my respect for Dr. Miller and his views is so great that I cannot do otherwise. Especially would this be the case on a subject that he has worked out to a conclusion and that I have only opinions about.

"Dr. Miller's article was both timely and valuable, and I was very glad to have the opportunity of reading it, though it was somewhat disappointing in results."

About the time when I was sending out my queries, I had occasion to write a private letter to that well-known American practicing in Paris, Dr. Arthur Hugenschmidt, and I asked him for an opinion upon this subject. I am glad to say that it reached me in time to be presented to you. Dr. Hugenschmidt writes as follows :

"Clinically (not chemically) speaking, we meet with two varieties of green tartar,—a superficial, diffused form ; a concentrated and localized one : one leaving the surface of enamel, when removed, untouched ; the other showing certainly an alteration of the superficial layer of that tissue.

"The superficial or diffused variety is found more generalized—that is, on a greater number of teeth—than the localized variety, although it may be only limited to the four anterior teeth. It covers much more of the surface of the tooth than the concentrated one, it is very thin, although the green color is very marked ; dries itself easily when a napkin is passed over it. The use of pumice-powder or the application of a mineral acid will remove it entirely, while the final polishing with chalk will leave a normal surface.

"The concentrated or localized variety is more often found on the four of six upper teeth ; placed on the labial surface of the tooth, immediately beneath the neck of the teeth, and does not cover much of the surface, as the preceding variety does, and is comparatively thicker by the intermixture of a something else, mucoid in appearance, which gives it a more or less greasy appearance, and which I believe to have much to do with the lesion of the enamel found after removal. This variety is especially found on teeth where the brush never passes.

"After polishing this variety with pumice-powder, we still find a rough, pitted surface, which does not disappear, even on the application of a strong mineral acid, indicating that the superficial portion of the enamel is involved."

Of the eight communications which have reached me, only two,* Dr. Andrews and Dr. Black, agree with Professor Miller. Again, while these two gentlemen are high authorities, and have a reputation in the very field which Professor Miller works in, I must call your attention to the fact that both of them merely express an affirmative opinion upon Professor Miller's theory, but do not advance any argument in support of it.

Opposed to Professor Miller we have six gentlemen, and these at least offer some pertinent objections which must command respect and be disproven before the new theory can stand.

Professor Truman says pertinently, "If roughness precedes all deposits of green-stain, it would seem that all disturbances of the enamel on the labial surfaces of the enamel of the anterior teeth should be followed by this deposit," etc.

Dr. Jarvie says with equal force, "My reason for believing that the stain is formed first is, that I have seen it upon teeth of dense structure, upon which, after removal of the stain, no disintegration was observed," while Dr. Allan reports very interesting cases where he has noticed green-stain of varying density, subjacent to which he found decalcification of depth proportionate to the amount of stain which had overlaid it.

As there seem to me yet some arguments which have not been advanced by those who have kindly sent an expression of opinion, I will call your attention to them.

First. I will state clinical facts which I am sure have all been observed by various members present, if they have not all been seen by single individuals.

Green-stain being present upon the labial surfaces of teeth, upon removal reveals a decalcification of the enamel. This lesion presents as a chalky, whitish spot of precisely the pattern of the stain which overlaid it.

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* Dr. Kirk's communication reached me after writing the report.

Second. Green-stain being present in apparently similar quantity and density, upon removal leaves the enamel normal, the polish and color being normal.

Here are two contradictory statements, both of which are clinically true. Therefore no theory is tenable which does not account for both facts.

Professor Miller advances the idea that the stain is deposited upon a roughened surface. This is agreeable with the first postulate, for, if the stain be removed, the roughness would be found. But how does it agree with the second condition? If the answer be that the stain is more probably deposited upon a rough surface, but that it may find lodgment even upon the most polished dense enamel, then the question can be asked in further argument, "If a polished surface can receive the stain, the stain being present, how do you prove that a roughening preceded it?"

Against the theory that the deposit occurs first, and decalcification ensues, there can be no such argument erected, because the presence or absence of decalcification under the stain only argues a slight or a great power of resistance to the corrosive agent, whatever it be, which the theory claims resides in or is associated with green-stain.

But the chief argument which I have to offer against Professor Miller is as follows: His claim is that the decalcification occurs first, and the surface, being thus roughened, offers an inviting spot for the deposition of the stain. This necessarily premises that if the decalcification occurs first, and the deposition of the stain follows, there ought to be a moment of time when we could find the decalcification present and the stain not yet deposited. Now upon this proposition I ask your experience. Bearing in mind the characteristic chalky character of the decalcification which is found under the stain, will any one say that he has ever seen the decalcification with no green-stain deposited over it?

This leads inevitably to the following: Green-stain is not present in all mouths, nor even in the mouths of all uncleanly persons. If the decalcification of enamel is a separate process, we should find it in the mouths of those who are immune from green-stain, which we do not. If it is only found in the mouths of those who have green-stain, and if with these the formation of the stain is so rapid that the decalcification is always covered by the stain, then I claim that the association is a most suspicious one, and is comforting to those who advocate the theory that the stain causes the decalcification.

Next I will invite your attention to another aspect of this question.

Let us suppose that Professor Miller's theory is tenable to the point that a decalcification has occurred, and that it has subsequently been covered by green-stain. Then at this period of time two propositions confront us:

First. The complete covering of the decalcification by the stain will prevent the further progress of the destruction of enamel.

Second. The deposit of stain will not hinder the progress of enamel-decalcification.

To have the first condition a true one,—viz, that the deposit aborts the decalcification,—the advocate of the Miller theory must argue in answer to the previous objections that the decalcification is never seen uncovered because the most microscopical roughening immediately invites the stain, or, at least, that the roughening only proceeds to a certain depth when it is covered. If this were true, then if the stain acts protectively, we should find upon removal always the same amount of decalcification, neither more nor less; or, more correctly, the decalcification should surely be covered before the enamel has been perforated and the dentine reached. Consequently, the removal of the stain should never reveal the dentine exposed, whereas I have noted this many times.

If the argument is that the stain is not protective and abortive, then it follows that decalcification of enamel may be progressive under green-stain, which, after all, is just what we claim who say that green-stain is a menace to the tooth, for certainly no one has seen a progressive decalcification of enamel (of this peculiar chalky variety) where the teeth have been free from stains.

Discussion.

Dr. Ottolengui. Since reading my paper, I have received a communication from Dr. Kirk on this subject. I wish to read it as a supplement to the report, especially as it takes a stand in favor of Dr. Miller's paper. [Dr. Ottolengui here read the letter.]

This letter of Dr. Kirk states that the lesions come separately and independently. The statement which I make, that such a thing is not true, being a negative statement is of no value in the presence of evidence that it has been seen. I may see a thousand cases in which it does not appear, yet my evidence that it cannot exist is of no value when compared to one case which you have seen. I have seen decalcification of enamel which is not associated with green-stain, but it is always associated with something else. Dr. Kirk speaks of the accumulation of food débris, so that no matter how many times a day the person scrapes or brushes his teeth, you will always find that little whitish substance there; but it is a question whether that is not the same thing that causes the green-stain. What I want to say is that I have never seen in a perfectly healthy mouth, with healthy gums, decalcification of the enamel, and I would like to know whether any one else has seen the white decalcification of the enamel removing the polish of the enamel.

Dr. Sanger. I am very much interested in the report of your correspondent. It is one of the subjects that I hope to hear very much about. I am not prepared to make any definite statement at all. Further than that, I have a strong conviction that your correspondent is on the right side of the subject. My clinical experience in that direction has always led me to suppose that the erosion, if you choose so to call it, occurring under green-stain, was due to the green-stain, and not the same that you find where there is a white decay, or a softening of the enamel at the neck of the tooth. I stated to Dr. Ottolengui that I thought he was wrong in saying that he had not seen this softening in connection with the green-stain; but I have since thought that over, and I am not very positive about it.

Dr. Nash. I think that it is a clear understanding that we can have green-stain without the presence of this disintegration, and that we can have an eroded surface or that condition of dissolution of the surface, with a whitish opaqueness, independent of the green-stain. I have seen the dissolved surface associated with the green-stain, and also independent of it. In both cases it would seem to indicate that the mouth was not a perfectly healthy one,—not that it was not a clean mouth, but there might be some constitutional cause for the condition.

Dr. Starr. I would like to ask Dr. Nash if he has observed that decalcification of the teeth as it occurs under the green-stain, affecting the labial surface, or whether it simply affected the neck of the tooth.

Dr. Nash. Not the whole surface ; only the cervical margin.

Dr. Hart. I wrote a short note to the correspondent, and he incorporated it in his report. I stated clearly there the impression that I had formed,—that the acidity of the green-stain started a chemical action on the enamel. When that penetrates deeper it starts an inflammatory action, and the two unite and produce caries. The action at first, in my estimation, was purely chemical.

Dr. Jarvie. The question as it is raised by the correspondent was this : "Which do you believe appears first,—the green-stain, or the eroded or corroded condition of the enamel?" whether the eroded condition is due to the green-stain, or the green-stain follows the corrosion of the enamel. I think that cases of people of middle age must have come under the observation of every gentleman in the room, where the teeth are highly calcified, where there is no decalcification, although the green-stain appears. You may find a slight decalcification ; but as the green-stain progresses, you will find that the decalcification is not there. It seems to me that is conclusive that the green-stain must come first ; because when polishing off there is no disintegration. I believe Dr. Miller states as positively as he states anything, that he thinks the disintegration of the enamel is consequent upon the green-stain. It would seem to me, upon reading his paper carefully, that he was not very decided as to his conclusions ; that if he had taken more time for his experiments and for the deductions, the result might have been different. Upon reading what he has said, and knowing my own observations, I am not at all prepared to coincide with him, and I dare to say this in the face of gentlemen like Professor Andrews, Professor Black, and Dr. Kirk, who agree with Dr. Miller. In the statements of these gentlemen I notice that they say they have not given the matter much consideration, but they think he is right. They do not say on what grounds they think he is right.

Dr. S. B. Palmer. I did not desire to speak on this subject at all ; but since the remarks of Dr. Jarvie as to which appears first, I think we ought to settle that. We might as well ask what runs the cars here,—electricity or magnetism. It is electricity on the wire ; it is magnetism when it gets into the motor. I coincide with Dr. Miller's theory. The real cause of the whole thing is oxygen. What is oxygen? It is the most negative of all elements. This thing is the same as having a jar with positive elements in, and introducing the negative element. That is what oxygen does.

If you dissolve out the enamel, oxygen goes to work on the organic portion of the tooth. There is a surface near the gum where the oxygen of our breath produces a chemical effect that oxidizes and decomposes. What is the result of decomposition? An acid. Then comes the green-stain. Some say it is a vegetable growth like lichen ; but whatever it is, whether thick or thin, the surface is covered by the oxygen passing over it, and the acid works into the dentine and dissolves out the lime. Place a plank in the ground, with one end up; the upper part of the plank may remain firm, and the lower part may decay. A leaf placed on the ground may decay on the under side, while it may be perfect on the upper side. Faraday gave it to us in a mineral style. He said, take one hundred pounds of steel and alloy it with one pound of platinum. Place upon it sulfuric acid so weak that it will not affect other steel, and it will affect that. What is the cause of that? Because each part of the platinum is alloyed with the steel, and has rendered it positive. Take the same quantity of steel, and it electrifies it, and makes the iron or steel negative, and thus it is preserved. We must carry this law up into the organic kingdom. Oxygen penetrates through all organic matter. In water, it is satisfied with hydrogen. Thus the earth with the water is neutral, or nearly so, and the oxygen of the air above is combined with nitrogen to such an extent that we can breathe it. That is the key that unlocks the mystery. At the surface of the earth, so far up as moisture comes, decomposition or oxidation takes place. Place a pole in the ground, and it will decay at the moist line. Place a stick in a flower-pot, and it does the same thing, because that flower-pot is the earth to the stick and the plant growing there. The same thing applies here. Here are the roots of the teeth buried in the gum, but by the force of oxidation, the oxygen passing over by the food or the breath, an acid results and oxidation occurs. This green-stain is mere oxidation, an elementary law. Some will ask why is it that we find this stain without this disintegration. If you have studied this subject, you will know that the acid is the result of oxidation and decomposition, where oxygen is set free; but there are cases where it has an alkaline reaction. Thus we say that metals corrode, vegetables decay, animal substance putrefies. The animal substance gives an alkaline reaction as a general thing. We must treat this differently in the root-canal, because it calls for just the opposite to subdue the micro-organisms there. It is merely oxidation, and the oxidation occurs where there is nothing to hold the material on the surfaces of the tooth long enough to turn it into an acid.

The president introduced Dr. J. Allen Osmun, of Newark, N. J., who read a paper entitled "Is Pyorrhea Curable?" which will be found at page 528 of the current number.

Discussion.

Dr. Osmun. If any of you have articular or muscular rheumatism, you will find the remedy I have mentioned in the paper to be a very good one. Its action on the uric acid is marvelous. I saw a case only the other day where an analysis was made, and we could not discover the slightest trace of uric acid, and yet the physician was sure that the patient was suffering from uric-acid poisoning. This treatment was used, and the amount of uric acid eliminated was simply wonderful.

Dr. Barrett. Is this a solvent of uric acid or of the urates?

Dr. Osmun. Both. I would call the attention of the gentlemen to the fact that if you send to 55 Maiden Lane, New York, you will find the new remedy explained by a little circular which will be sent to you. The formula is five grains to five ounces of water. A tablespoonful in a little Vichy water is the way it is used.

Dr. Rhein. When I saw the program for to-day's meeting, I was very much astonished at the title of the paper, and I have waited with some interest to see what could possibly be the motive of such a title. While I esteem very highly what the author has just had to say, I must disagree very thoroughly with the conclusions he reaches, and the definition of the words with which he entitles his paper. It is just as feasible to entitle a paper "Can Typhoid Fever be Cured?" or "Can Measles be Cured?" Pyorrhea has been generally understood by the profession at the present time, when we leave the simple forms of unclean mouths, to be a symptom of some other trouble. If the author means to say that the trouble as presented locally cannot be cured, I must disagree positively with him. The trouble in the majority of cases can be cured. But then we have the question as to what has caused that trouble,—the primary cause,—and it is a question which must be settled with each distinctive case. I have often heard this question brought up, and dentists have a common way of saying, "We can alleviate pyorrhea, but we cannot cure it." I have reached the conclusion, after a great deal of hard work in this particular field, that in the majority of cases, or a very large percentage of them, pyorrhea as presented in almost any mouth can invariably be cured; but that does not preclude the fact that that patient may get another attack of pyorrhea. You may get a cold in the head and be positively cured of it, and you may have a hypertrophied condition of the bone in the nose which makes it easy for you to get another cold; but that does not preclude the fact that the original cold was cured. So it is with pyorrhea. I make this statement in order to draw a line in contradistinction to that every-day view which is taken by many of us. It does not put the matter straight to the patient. You should say to the patient, after making a thorough diagnosis of the case, and you are certain that you can cure that case, "I think I can cure this disease as it at present exists; but you may be liable to a recurrence or another attack of the disease, the same as you may get another cold after having been cured of the first one." That would put the matter in an entirely different light. The author speaks of the fact of a necrotic condition being present. Our worthy president has put himself on record in regard to this matter, and I agree most entirely with him on that point. I have seen a great many cases of pyorrhea in every possible form, but I have yet to see a case where there is the faintest shadow of any caries or any necrosis. I would give a great deal to see a case of what we understand as pyorrhea, where there is caries or necrosis of the tissues. We have simply a condition of giant-cell development, which preys and eats upon bone in whatever form it may find it. That is the condition we have, and that is why we speak of absorption or resorption of the bone-tissue, because the cells feed on the bone-material which they find, and the feeding upon them makes them more numerous, and in that way the disease progresses; and the cure of the disease, after all irritating materials have been removed, rests merely upon the removal of that giant-cell tissue. If a person took the matter logically and removed the giant-cell tissue which exists in all these cases, and left the parts in such a condition that the micro-organisms would not have access to it, that would be the solution. That is where a very important part of the treatment of the disease comes in,—a portion of the treatment that must be maintained after the patient leaves the office of the operator. That is where the author manifested another point where I disagree with him. He spoke of cases of so-called caries, where there was a constant recession of the gum-line after treatment. If the original treatment of the operator were proper, that would indicate that his directions to his patient were improper. The patient has, in my opinion, a much more important part to play than the operator, and his part is in preventing the intrusion of micro-organisms into the pyorrheal pockets until the parts have assumed a healthy, normal condition. It would take too long to enter into the details of what the patient ought to do under these circumstances. Another question in the paper is where he spoke of urinary analysis not showing uric acid. I cannot conceive of such a condition of affairs. One analysis might be insufficient to show the uric acid ; but it should be examined at different intervals during the twenty-four hours. If there is any uric acid in the urine, I cannot understand how an analysis would fail to show it. In regard to the treatment of the predisposing causes of pyorrhea, that involves a question which I think is very pertinent to a dental gathering. Should dentists prescribe for any general condition that we have found to be a predisposing cause to this condition? My own opinion is that where there is simply a lack of tone to the general system, where, after a careful diagnosis, physical, urinary, and of the family history, we come to the conclusion that there is merely a wearing away of the patient's vitality, it is permissible for us to prescribe, in order to get up the general tone of the patient ; but as soon as we find a condition of affairs involving the derangement of any vital organ, or if there is rheumatism or any condition that requires radical treatment, we should stop with our own treatment, and we should consult either with the family adviser of the patient, if he has one, or insist upon another man being called in to co-operate with us in our work, if we want to achieve the best results.

Dr. Jarvie. I do not know that I have anything special to say on the paper, except to express my gratification with it. It is one of the best papers we have had on that phase of the subject. I cannot help but agree with Dr. Rhein in reference to the title, as we would infer from it that the disease could not be cured. I think its local manifestation can be cured, and is very frequently cured. After the case progresses to the absorption of the alveolus, recession of the gum, and loosening of the teeth, I do not think we ever cure it ; but such teeth as were brought to our attention by the paper this morning are frequently cured. In almost all cases their amelioration can be secured. As to a recurrence of the disease, that is another thing. I often present this phase of the subject to my patients. They say, "My teeth and gums seem to be all right. Will it ever come back?" I say, "Very likely,—more likely than if you had never had it. You are in the same condition as a person who has just recovered from pneumonia. That person's lungs are weak, and he is more likely to have it again than a healthy person. So it is with your gums and teeth."

Unless and until we are able to treat the constitutional tendency successfully and eradicate it, we are likely to have a recurrence of pyorrhea. There are comparatively few people over forty years of age who do not have a tendency to pyorrhea in some of its manifestations. I believe the attention of the medical fraternity has been directed to this disease, and I think the time will come when we will be able to cope with it much more successfully than in the past, through constitutional treatment.

Dr. F. W. Low, of Buffalo. I treated a case of this character with peculiar results, and I thought it worth while to report. The patient only had one pyorrhea pocket, but it was very obstinate. There was a persistent discharge of pus. I did not succeed in curing the pyorrhea, but I did succeed in doing some good. The patient was remarkably young for such a manifestation,—not over eighteen years of age. She had been receiving attention from a chiropodist for what she thought were chilblains for some months. She finally became discouraged, and went to a surgeon in Buffalo. He was about to go away for the winter to Bermuda ; but he advised her to discontinue that treatment, and he said he would perform an operation on the enlarged toe-joints when he came back. I treated her, and found that although I did not cure the pyorrhea, I did cure her toe-joints. She had a very marked uric-acid tendency from her great-great-grandfather, as near as I could learn.

Dr. Butler received a number of very interesting papers at the time that the worthy president of the State Society visited the Eighth District, and we had a very interesting meeting. One gentleman with whom the doctor corresponded—Dr. Kirk, of Philadelphia—failed to respond at that time ; but he has written Dr. Butler a personal letter in which he recommends for the constitutional treatment a preparation made by McKesson & Robbins, called tartar-lithine, which is a bitartrate of lithium. They are five-grain tablets, and they are markedly acid. I do not know whether they will interfere with digestion or not. Of the medicine recommended in the paper I have no knowledge, having used it but a short time. We should discriminate somewhat whether we turn the patient over to the family physician for treatment or recommend him to some expert. Many physicians will not admit that the teeth are of such great importance as they really are. Unless I know my patients are under the care of a physician of more than ordinary ability, I take the liberty of suggesting the name of some one whom I know will do better for them than their regular family physician.

Dr. Osmun. The discussion and the talks I have had with the members do not change my opinions. I cannot conceive that the amelioration of a disease is a cure of it. Dr. Rhein spoke of typhoid fever. If my patient came back with all the symptoms of typhoid, I should not consider that I had cured him in the first place.

About finding uric acid in the urine : if it is eliminated, we do not get uric-acid poisoning. When we have that poisoning, it is *prima facie* evidence that the kidneys are not doing their duty. We have all kinds of troubles arising from that. The point of the whole thing hinges here : that this absorption of the bone—this resorption or whatever you call it—is a natural process, and this disease that we recognize under the head of pyorrhea is simply an incident. For instance, take a case of phthisis pulmonalis. By putting that patient on a diet of cod-liver oil and other strengthening things, you stop the night-sweats and other symptoms. Stop the treatment, and you have a recurrence of all the symptoms, and the patient finally dies of the disease, unless his life is cut short by an accident of some kind. To cure a patient is to remove the cause of the disease. It does not mean to alleviate the symptoms. We cannot do it, in my judgment; therefore we ought to tell the patient honestly that we can control it, but there will be a recurrence of it in five or six months, or longer, according to the patient's environment, or his want of co-operation with the dentist, and other things that will occur.

(To be continued.)

UNION MEETING OF THE MARYLAND STATE DENTAL ASSOCIATION AND THE WASHINGTON CITY DENTAL SOCIETY.

(Continued from page 473.)

FIRST DAY—*Evening Session* (Continued).

THE secretary read the following report from the Committees on Mechanical Dentistry and Dental Pathology and Therapeutics:

The first paper was by Dr. James B. Hodgkin, and was entitled,—

ARE ARTIFICIAL TEETH PROPERLY SHAPED?

That man is omnivorous is a truism. That he can live anywhere on the globe, and on any sort of food almost, is as well known. But the line of departure between man and his relatives, the beasts, is at the point where man begins to prepare his food for use. This is the grand physical distinction between the inferior and the superior races. Man has been defined as an animal that makes a fire; but a better definition may be that he is an animal that cooks his food. And this line of departure is of immense importance as related to his teeth; and teeth—the teeth of man—is what we, as dentists, are obliged to discuss over and over again.

Can I strike a thought that is novel, and at the same time not crude and ill-digested? What if I say that man's condition is so modified by the fact that he cooks his food as to make a radical change necessary in his teeth? What then?

Please look over the teeth of man,—yours, mine, our patients',—and record what we see. Incisors, cuspids, bicuspids, molars,—you will say. Very well, so it is. Incisors for cutting, cuspids for tearing, molars for grinding. Three functions, cutting, tearing, grinding.

Knives for cutting were unknown when the evolution of teeth took that form. Forks, an inventi n so modern as to be almost within the recollection of our grandparents. Molars, what of these? We read that the old Roman soldier carried in his haversack wheat in the whole grain, taking it out as hunger demanded and grinding it between his teeth. We know of the savage who tore his food piecemeal with strong cuspids, and further divided it with molars. We go away back and think of evolution,—think of the grinding, tearing, cutting that man did when he was an aboriginal,—and then, comparing him with what he is now, the difference is simply amazing. The broad arch has been displaced by a narrow one, the molars diminished in size, the cuspids shortened and dulled, the jaw itself dwarfed and diminished in strength ; in a word, the whole dental outfit modified in size and strength.

The coarse animal, who ground and tore his food, has given way to the thinking animal, who cooks and precomminutes his aliment, until the dental apparatus itself is modified to suit the change of diet. Grains are no longer ground between the teeth—the millstone work is obsolete. Tough and stringy meats are no longer torn asunder by the strong cuspids, and cut by the powerful incisors. Cooking has done it. The softest bread, crustless and easy of division, is at hand. This is probably soaked in liquid of some sort, and the puddings, pastry, oatmeal, etc., are almost ready for swallowing when dished. Aside from flesh meat, it is no great matter if the man has *no* teeth, or, at most, if they are weak and imperfect. But if he has artificial teeth he will tell you that he has but one difficulty,—he cannot chew meat. This is the difficulty that almost every patient has to contend with, the story that almost every dentist hears. To chew meat is the desideratum. Other foods are manageable, but to chew meat—?

Molars, for grinding, the books tell us is the derivation.

Meat is the thing the patient wants to chew. But is meat intended to be ground? And are millstones the thing to grind it? These are the questions I am asking myself and you. The answer should come not from the graminivorous, but from the carnivorous, animals. The beasts that use meat, and that alone,—what of them and their teeth?

If evolution be worth anything to us, it ought to suggest the answer that the teeth are modified to the diet; that the teeth of animals that live on meat are fitted for that diet, just as the teeth of grass-eating animals are fitted for that work.

My thought is leading me, as you see, to the idea that perhaps in our imitation of the teeth of our patients, the teeth that should have lasted till life and its functions were gone, may not be just the thing. Why? you ask. You do not expect to improve on nature? Well, yes, if it can be shown that nature is imperfect. Who are all these we see—about every fourth person—with glasses to assist vision? What is the trouble? Imperfect nature. Who are these who are wearing artificial dentures? Imperfect nature again. What of wigs, and, indeed, corsets? Imperfect nature. To assert—and this is the nature of this paper—assertion, asking to be successfully controverted—it is asserted that inasmuch as the main difficulty with those who wear artificial teeth is that they cannot eat meat, it follows as a consequence that either the dental apparatus is faulty in construction, or the meat-eating capacity of man has been modified. Again, and reassertive, a millstone is not an organ for grinding meat; it is suitable for grinding grain. Then why not, seeing that the meat-eating animal, man, has lost his meat-eating organs, and asks for replacement, why not give him such as in some degree conform to those possessed by the carnivora?

Watch your dog, your cat, eating. Note that the jaw has no grinding motion, but works like a pair of shears. Note the exceedingly careful manner in which the cat comminutes her food. Note the organs she uses, and the shape. From the remotest days she and her congeners have eaten meat. Try her with grain. The apparatus is inefficient. She wants the mill for that. Try her with meat, flesh,—mastication is complete.

Now, and at the last, seeing that we are making an artificial denture, and that we are making it for special purposes; seeing that man cooks his food, and, so far as the grains are concerned, has ceased to be a grinder; seeing all this, and being confronted by the fact that those we supply with artificial dentures, if making any complaint, make it on the flesh-eating line, why not modify the grinding-apparatus and make it conform in some measure to that of the carnivora?

It is futile to say we must conform to nature. Nature is so modified and changed by environment as to make her no longer natural; or, if that speech is offensive, we are made artificial by artificialities, and must simply take things as we find them.

It would be possible to make this paper a long one, but for obvious reasons I do not do so. All I have attempted is to outline what we may find as to modification of original conditions, and to show that it may be that in attempting to follow nature we have erred in not noticing the modifications that diet may make necessary in our (artificial) dental apparatus.

Go through our markets and notice the enormous consumption of meat. Man is becoming, I think, more and more a flesh-eating animal. Now, if we make teeth for the toothless, why not make these conform to function? If the function is that of meat-eating, and if this is what the patient is unable to do satisfactorily with the artificial organs furnished him by us (those in common use, and patterned after the inherited molars of the ancients), may it not be well to try what teeth fashioned somewhat after those of the strictly flesh-eating animals will do?

Dr. Hodgkin also contributed the following paper, entitled,—

The Origin of Pathological Conditions.

To write all of dental pathology is to make a book, and a big one at that. To make a specialty of a specialty seems puerile, yet it is necessary in this day of subdivision.

Pathos, pain; *logos*, a discourse;—we are familiar with its derivation, familiar with its suggestion of suffering, its consequences, its results; less familiar with its methods, its secret workings, its hidden character. To know the secret of life, to know cell-origin, to fathom the mystery of nature, whereby she fashions cells and fabrics from cells, and how from impressions so vague and occult as to not betray their presence save by their results, she biases the whole work so that it leans this way or that, is predisposed to this or that sort of ultimate break-down,—to know all this is indeed knowledge.

But until we know life in its fullness we may not hope for such knowledge as will show us the origin of the "pathos." Until we know why man grows to six feet, how can we know just why or how an occasional dwarf is produced?

One thing is certain: that of all nature's constancies none is so persistent as "type." Moving within certain lines and developing along narrow channels, nature is, with very slight deviations, one. The man of to-day is physically like his ancestor, the savage,—so like that we are puzzled to discern whether the skull we exhume was buried one hundred or one thousand years ago. And mentally, this is more true than we are willing to confess. Reproduction, not creation, is man's mission, and reproduction within certain well-defined limits. But in reproduction the man has been allowed by nature, if I may use the term, to reproduce not only his individuality, physiologically, but to some degree his abnormalities and weaknesses. All, however, within certain limits. Over all and above all the slow and unconsciously moving hand of evolution fashions him into something better, or worse,—who shall say?

Why one man should be so constituted physically as to be predisposed to pneumonia, another to heart or kidney or nervous trouble, is, on the face of things, easy to answer. We flippantly say, it is inherited. Why inherited? The type persists, six feet high and with organs perfect so far as function goes. What is that subtle and intangible thing we call hereditary predisposition? How far can we go in studying and analyzing this subtlety? With the two forces operating, one strictly enforcing the type, and the other causing, within certain limits, physiological deviations from that type, there seems to be a *third* force, or possibly a modification of the second force. Pathological conditions, or the tendency to pathological conditions, seem as strictly inheritable as physiological ones. That constitutional bias by virtue of which certain diseases are likely to be developed, seems as much an inheritance as symmetry of form. So we find, as hinted above, that almost every constitution has its predispositions, and these are as distinctive as the color of the eye or the form of the hand, the shade of hair, etc. One family is predisposed to consumption, another to paralysis, and so on, to the end of a long chapter. And it is a most singular fact that even a supernumerary finger or toe is inherited as distinctly as a certain temperament. We say of a certain man, "He goes too fast, walks, works too rapidly; it makes him nervous." Rather it is that his nervous force makes him go as he does, and he does this because he inherited the tendency. One of the most singular of these inherited traits, or rather the manner in which inherited traits are received, is seen in the matter of maternal impressions. I do not allude to those vague and obscure impressions in utero of which we hear so much among the laity and so little among the professionals, but of that peculiar stamp or impress made on the maternal force or spirit, that immaterial thing about which the physical molds itself. A widow, remarrying, has children resembling her first husband. A female of any species receives an impress from her first sexual contact with the male which persists often through the greater part of her reproductive period. Thus a female dog, a mare, etc., is stamped in some mysterious way with the effect of her first copulation.

Taking the two forces, then,—that of the persistence of type,—that of the differentiation of type within certain limits,—and that third force a modification of the second,—the inheritance of pathological tendencies and grouping these,—we have the sum of what constitutes our mold.

The question at the bottom of all is, In what way and at what time are these semi-pathological impressions made on the constitution? Is it in the "nine moons which go to make up the man," as Tennyson expresses it? Is it from accidental or incidental impressions made on the fetus in utero through the influence of its mother's nervous system, as some are fond of imagining?

I cannot think this last is true, as it would lead us to give the most lively imaginative qualities of mind to the dullest of the dumb brutes. A single illustration will show my meaning. We have the picture sometimes in the courts, sometimes in private life, of the seduced and betrayed woman abandoned to her fate by her betrayer. He refuses, after gratifying his passions, to make any amends for his crime, and leaves her to pine in solitude until in the course of events she comes to the maternal period. Imagine what a torrent of feelings possess her; now rage, now desperation, now despair, now hope. I cannot imagine a more troubled sea of unrest than the mind and soul of such a woman. Shame, fury, revenge, love,—a commingling of all that would make a turmoil of the soul possesses her until the somber and, to her, disgraceful end. Suicide, murder, entreaty, all struggle for place in her perturbed soul. Did all these make their impress on the mind and character of her unborn son, what a monster he must be! Yet we see as a fact some of the most illustrious of the world's leaders have been such. I am told that on the bench of the Supreme Court of one of our greatest and oldest states have sat at one time four judges, great and noble, three of the four bastards.

It comes to me with more and more of force and conviction that we are to look for pathological tendencies no less than physiological stamp at the moment of conception. When spermatozoa and ovum come in contact, and the edict goes forth that a man-child is conceived, I cannot but think that he takes his ideal shape then and there—that if he is to be tall or short, have blue eyes or black, have his mother's family characteristics or his father's,—that all this is the result of the culminating stamp of concept, and that, as Minerva sprang full-fledged from the brain of Jove, so the created man is created with all his peculiarities and idiosyncrasies, his constitutional bias, then and there.

Hence we see that in this light the child has teeth the form of mother or father, or the jaw of one and the teeth of another; sometimes the front teeth of one and the back teeth of the other. The stamp of heredity is on the enamel, making it thick or thin, as it is on the finger-nails, shaping these. Such a theory as this relieves us from the necessity of believing that man is the creature of the numberless accidents and impressions of intra-uterine life. It shows us that in this way only can the type be preserved. It absolves us from belief in the doctrine that teeth are starved in an otherwise well-matured body, and that, save in the case of accidental interference with nutrition, as in the case of an eruptive fever or the pitted and semi-lunar markings of syphilitic inheritance, they are molded in the form and after the style of their ancestors.

It has been years since I began to feel that we as creatures are not the sport of all sorts of contingencies, the victims of transient circumstance. That man is the creature of his environments is a broad truism, but too broad for more than a very general application. He is not the defenseless and helpless thing that the dogma above quoted would make him. Not only man, but even the inferior animals, mold circumstances, and take advantage of ebb and flow to gain the desired haven. And we have only to look about us to see that he as much creates the world in which he dwells as is created by it. His nature clings to the type idea with great tenacity, and I do not see that environments have much modified that great fact. If this paper has a central idea, it is to show that the "creative stamp" is greater than any environing influence, and that individual creation is ideally a unit. Not by slow aggregations, but by a full, complete, and perfectly accomplished act is conception; the development of the "individual ego" is the result of that crowning inception, and not the result of emergencies and trivialities. In the light of this basal theory, we see how semi-pathological conditions themselves by heredity become constitutional, transmit themselves by one swift act to their successors, and by the individuality of primal stamp become a part of the person. Weak teeth, weak lungs, weak eyes,—any weak organ is transmitted, and we, as pathologists, have to battle with the weakness.

On motion, the convention adjourned.

SECOND DAY—*Morning Session.*

The convention was called to order at 10.30, Dr. W. E. Deiffenderfer in the chair.

On motion, the paper read at the previous morning session, by Dr. L. C. F. Hugo,* was taken up for discussion.

Dr. W. M. Hunt said that his memory went back to the time when no cohesive foil was used, and we used to take pains to get rid of the sticky property, as it was called. The description given by Dr. Hugo of the construction of a filling with non-cohesive foil is the most perfect he had ever heard. He mentioned two theories of the building up of non-cohesive gold.

The first is the wedging process. This is a poor method, because when foil is introduced into an irregular cavity it will be impossible to force it by wedging to fill all parts of the cavity, because the pressure will act upon the projecting parts of the wall. Dr. Hugo advocates what used to be the practice of our friend Dr. Maynard, which was to place the foil in the cavity in folded ribbons, with the laminæ of the foil at right angles to the surface of the filling, then putting in additional foil and condensing it so as to have it adapt itself to the surface of the walls of the cavity; then he had a filling such as Dr. Hugo describes. In reality the description was more complete and more in accordance with old-time practice than any other he had ever heard. The process is always filling a cavity of decreasing size until so small that one piece of gold completes the filling. This last piece being inserted and the surface being condensed and polished, you have a perfect filling. Dr. Hugo in this last stage resorts to cohesive foil, which is an excellent idea where you need to restore the contour of the tooth above the margin of the filling. In other cases it is just as well to finish with the non-cohesive foil. Both qualities of gold have their appropriate places. The advantage of the non-cohesive gold is that it is more easily adapted to the inequalities of the cavity. Cohesive gold can be adapted to such inequalities, but requires more care in manipulation, and requires a different system of work and a different style of instruments.

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* "Non-Cohesive Gold Cylinders: How and Where to Use Them." See DENTAL COSMOS for June, page 433.

Dr. J. B. Rich praised Dr. Hugo's description of the method of using non-cohesive gold, as mechanically correct, but he, being the first dentist who ever used cohesive gold, did not agree with Dr. Hunt that non-cohesive gold was more easily worked than cohesive. He had used cohesive foil fifteen years before others would use it. The universal practice in those days was to place non-cohesive gold in the cavity in large quantities, and wedge it into place, and when he advocated the insertion of only small quantities at a time and condensing each piece as it was put in, dentists thought he was wrong, and said they could do as well in their way; but when he challenged them to test it, he proved he was right. He took a filling made in the old way in a tube, and putting water on top of it attached an air-pump to the tube and forced the water through, and the same test proved that the water could not be forced through his filling. He began to use cohesive foil about 1837, but other dentists did not use it till Watts introduced his crystal gold in 1843. When we have time to put it in as it should be, cohesive gold makes a perfect filling, which will be absolutely tight and will not rock in the cavity. In the days when only non-cohesive gold was used, the best method was like that described by Dr. Hugo. The gold was put in in strips, increasing in height till the cavity was almost full, and then small strips worked in to near the bottom of the cavity; then the excess of the gold extending above the cavity was worked over this center part and condensed. In a compound filling the space was extended down from the angle, and the ends of the strips worked over the angle of the filling.

Dr. H. C. Thompson said that the shape of the cavity controlled the method that must be used in putting the gold in place. If there is an irregular surface, wedging will not answer, but small pieces must first be introduced to fill up the depressions and make the shape regular, then wedging will succeed. The wedging is, however, not done with the point of the instrument, but with the wedge-shaped shaft. In a compound cavity, the idea of an arch and its key must be kept in mind, and let each part of the cavity be filled independently and self-sustaining, the boundary of one to form the wall of the other. Care must always be taken that the line of attrition will be against the laminæ of the foil.

Dr. Hunt said in the use of non-cohesive gold, when he could not get the first piece to hold fast, he would put in another till they would hold themselves in position, then condense these at once, and thus form a foundation to build the cavity upon, thus forming an inverted arch for the bottom of the cavity. When this is accomplished, the remainder of the filling is easy. In filling with cohesive gold in foil, advantage can be taken of the laminæ to strengthen the filling, but in using Steurer's or other mass gold we do not have this quality, but must depend upon the cohesiveness of the gold for solidity, and each particle should be thoroughly condensed as it is put in place.

Dr Rich did not think the arrangement of the laminæ of much consequence, as when using gold in the shape of a rope, or ribbon, or pellets, the laminæ could not be preserved while filling. Every piece should be placed against the side of the cavity before the instrument leaves it, and each succeeding piece condensed against that already in in the same manner. He did not like filling with ropes, as they formed air-cells which had to be condensed out.

Dr. Noble spoke of the advantage of using the two kinds of gold in the same filling, but said that of course there was no wedge principle possible with cohesive gold.

Dr. G. H. Claude spoke of the superiority of cohesive foil in cavities having frail walls. He mentioned a filling he had made in a frail tooth by the use of Williams's pellets and cohesive foil. First laying a soft pellet against the sides of the walls and then filling with cohesive foil, he succeeded in building up the filling without injury to the walls of the tooth.

Dr. Rich had no use for non-cohesive gold as a complete filling, but used it till the cavity was half full, and left it in such shape as would give secure anchorage, then finished with cohesive foil.

Dr. S. J. Cockerille said his aim was always to operate in the manner which would bring the best possible results with the least trouble. He did not agree with Dr. Hugo that soft gold could not be used when the angle of the filling would come in contact with the opposite tooth in masticating. He knew that such fillings could be and were made, and he knew that soft gold would make a good filling for masticating surfaces. He knew of such fillings which had done good service for years with no wear apparent. He uses non-cohesive gold entirely, and thought it well to get used to one method of working, become proficient in it, and stick to it. His earlier method was to make a rope of the non-cohesive foil, but he now used it in the form of pellets. He had tried numerous experiments with cohesive and non-cohesive gold, and after testing fillings of each kind by weighing the amount of each that could be inserted in a cavity, he found that the non-cohesive gold packed closer and was heavier. The main advantage, however, which it possesses over cohesive gold is, that it takes less time and work to make a good filling. He knew of non-cohesive gold fillings that had done good service for thirty, forty, or even fifty years, and thought it doubtful whether any one present knew of a cohesive-gold filling in an approximal surface-cavity that had stood even twelve years.

Dr. Rich said that he did not contend that as good fillings could not be made with non-cohesive foil as with cohesive foil, except that cohesive gold made a much harder filling for masticating surfaces than soft gold would, unless a great deal of pressure is used with the soft foil. Cohesive gold can be made just as solid against a frail wall as soft gold can, if it is put into place in small particles. It is a matter of manipulation. Some men cannot do it, because they are incapable of delicate work. Some dentists are hardly fit to shoe horses, to say nothing of properly filling a frail tooth.

Dr. Hugo, in closing the discussion, said there might be some misapprehension as to the use of the rubber pellets. It of course was only the initial pieces that were pressed into place in this way. The loose-rolled non-cohesive gold is placed on the wall of the cavity and pressed into place with the rubber. He had seen fillings from the hands of Dr. Shoemaker, Dr. Longnecker, and, of course, from Dr. Webb, which had been built up with cohesive gold, and which had some of them contained as much as five books of gold, and which stood from twelve to twenty years of service. About Dr. Cockerille's tests of the solidity of fillings by weighing, they were not conclusive, because the results of such tests were not always uniform. Some time ago, in a series of such tests performed in New York, the cohesive-gold fillings were found to be the heavier.

Dr. A. W. Lakin, of Boonsboro, Md., read a paper, of which the following is an abstract, entitled,—

THE BEST MEANS OF SAVING TEETH, FOR THOSE PERSONS UNABLE TO PAY FIRST-CLASS PRICES.

Those of you who practice in large cities, where the wealth of the land is concentrated, reaping a harvest from what your predecessors have sown, surrounded by all the refining influences that knowledge and culture and superior skill can bring, with every appliance at hand to meet any emergency, can well afford a little professional aristocracy.

You have extravagant rents, costly outfits, and everything in keeping with the kind of patrons you serve, and must necessarily require a *quid pro quo* from your patrons. An extra hour spent in the finishing a filling, though not absolutely necessary for its preservation, is of but little consequence to them.

I admire beautiful forms and exquisite workmanship as much as any one, and appreciate the labor necessary to produce them ; but if cheaper means will accomplish the purpose, and a majority of the people are unable to pay for such expensive work, it is our duty to provide these the best material and skill their means will afford.

If it be true that we can only save teeth at such a cost as to exclude a majority from availing themselves of its benefits, then our profession is only a partial success.

Now I am one of those who still believe that a good soft gold filling, properly inserted, with the V-shaped separation, will save teeth fully as well, at half the cost of material and less than half the labor necessary for cohesive gold.

We can often dispense with the use of the rubber-dam, especially in filling small cavities favorably situated, by the judicious use of napkins, and save time and much inconvenience and pain to our patients.

Some, like myself, entered the profession when it had just emerged from its swaddling-clothes. There were some intellectual giants then, as now, as the rapid advancement and standing of the profession clearly demonstrates. You know how careful they were to conceal the gold from view in filling front teeth. The test of skill was the insertion of a good approximal gold filling in the least possible space.

It was considered very objectionable then to expose the gold. It is even so now, I care not how beautifully or skillfully executed. We may admire the workmanship ; but it is unnatural, and instead of preparing cavities so as to expose the metal, it were far better taste to conceal nature's defects wherever possible, instead of advertising them.

I know that a majority of the profession differ with me, but I am impelled to believe that they are influenced more by their great admiration for the skillful manipulation of gold than the restoration of nature or the remedying of her defects.

For those of you who advocate the building up of crowns, and extensive contour fillings of annealed gold, and who are well paid for them, it is all right, if your patrons admire such work. I presume it is to your interest to adapt your work in a measure to meet their wishes. But you are encouraging a fad that is not bounded by your practice.

It has become fashionable, and our country cousins have caught the infection, and want the same kind of fillings inserted for a dollar and a half or two dollars that cost their friend five, ten, or more dollars.

The worst feature of the whole matter is, that which should most concern them is lost sight of, and the glitter of the gold is regarded in the same light as the rings on her fingers or the hooks in her ears. In towns in the country where our patrons are prosperous, there are few who could pay, and fewer still who would pay, fee-table charges. Therefore a dentist has not the practice to make him proficient in that class of work, and much of it that is attempted fails in some particular.

I do not complain of any dentist charging more for his work than I do. It may be worth more; but whether it is or not, if he has the confidence of his patrons, and they are willing and able to pay three or four times as much as I can command, it is evidence of his superiority, and I have no right to complain; nor has he the right to demand that I charge more than my patrons are able to pay, to establish an equality that never can exist. It assumes to put every dentist on the same level, and his patrons are expected to pay fee-table rates regardless of their circumstances.

We don't believe that we are lowering the dignity of the profession by doing the best work, and using the best material we can, for the prices that they are able to pay.

There is not a dentist, especially in a country practice, who loves his profession for the good that he is doing, and not simply for the money that is in it, whose heart has not been made sad by patients leaving his office because he would not extract good strong teeth, easily saved, whose owners could not or would not pay the price.

What we need is cheaper material,—not inferior material, but the cost reduced in the same ratio as the food product, on which we all subsist.

Those of you who receive big fees can well afford to be indifferent; but if you believe in the utility of our profession, there is a higher law that should guide you.

The time has come when we must meet the growing demands of our profession, not as a luxury for the rich, but adapted to all classes and conditions of men.

The profession is striding forward and upward, demanding higher attainments, more expensive preparation; private instruction ignored, and one more year added to the college fees; all tending to the concentration of power in the few.

It seems that our boasted progress only carries us farther beyond the reach of the masses each successive year. If we would merit all we claim and hope for, we must aim a little lower, and more to the mark.

Discussion.

Dr. S. C. G. Watkins said that the writer spoke of saving time by not using the rubber-dam, but he thought the time had come when the rubber-dam should be used whenever a filling was put in, as no man lives who cannot do better work with than without it. At a meeting of the First District Dental Society of New York, many years ago, Dr. Webb made the remark that he never put in anything but gold fillings; he was asked by Dr. Meigs what he did when the rubber-dam could not be used. He said there never was such a case. Dr. Meigs then presented a case in his own mouth,—a cavity extending far above the gum-line, in the posterior surface of the second superior molar. An appointment was made to fill the tooth at the next clinic. In the mean time a special clamp was made, and the cavity was filled at a public clinic, using three or four books of gold. This demonstrates clearly that when a man familiarizes himself with the use of the rubber-dam, there are very few cases that he could not use it to better advantage than he could the napkins. In some cases it is practically impossible, but it should never be omitted for other reasons. One reason young men do not use other material than gold is because they are not taught to make other fillings. Most of the students can make a very nice gold filling, but do not know how to make an amalgam filling. They do not pretend to know anything about amalgam. They say they have not been taught, but have been taught to put in good gold fillings. If the colleges would give more attention to this, they would help the profession materially. About contour fillings not lasting so well as surface fillings, if they do not there is a reason for it, and, as Dr. Webb would say, the reason is defective manipulation, and he was not certain that Dr. Webb was not right. Perfect manipulation means many things,—the proper preparation of the cavities, the careful cutting away and polishing around the edges, not leaving weak or frail walls, the careful packing of the gold, and the method of finishing the filling.

He was not an extreme contourist. For instance, in approximal fillings between the bicuspids, he did not believe the filling should be built out to restore the original tooth-shape, but should be left a little short of it, as it would be less subject to strain and less likely to break away the margins and loosen the filling. This is very important, especially in an amalgam filling, as amalgam is so hard that when strain is brought upon it it will break and crumble the tooth much more than gold will. In these papers and discussions the speakers generalize too much, and do not go into particulars enough; the operations are not described sufficiently for the hearers to grasp each step. If this were not so it would be much easier to get at the true idea of the speaker, and carry it into practice in our offices without making mistakes. For instance, we are told, in discussing tin foil, to fill the cervical portion of the cavity with tin foil and then with gold. If this is done the filling will be a failure, because there is not enough tin. The tin in such a case will be eaten up and the filling destroyed; there will be nothing left but a mucky black mass under the gold. We do not understand what destroys it, but there is some galvanic or chemical action, or both, between the gold and tin, which accomplishes this result. Now, if a speaker would be more particular in such cases, and instruct us to use more of the tin, this destruction would not occur. The better way is to fill two-thirds of the cavity with tin, and then, instead of being destroyed, the tin will harden and solidify, and take to itself more the form of amalgam, and save the teeth.

At the close of Dr. Watkins's discussion of Dr. Lakin's paper, Dr. G. H. Claude read a paper upon the subject of operative dentistry, which was a thoughtful *résumé* of the salient points which characterize the development of our knowledge of operative procedures and therapeutics in this field. Especial stress was laid upon the importance of antisepsis in the treatment and care of the mouth, perfect sterilization of instruments and appliances being essential to successful treatment.

The constitutional and nervous elements which were undoubtedly predisposing factors in the causation of certain types of dental caries and other pathological conditions of the oral cavity were alluded to, and a plea made for their more careful study, in order that oral diseases might be more intelligently and successfully combated. The author then gave at some length his preferred methods of practice with regard to the treatment of caries, and called attention to the necessity for careful discrimination in the selection of methods intelligently adapted to the case at hand.

The paper was not discussed.

Afternoon Session.

The convention was called to order at 2.30 P.M. by Dr. B. Holly Smith.

Dr. A. W. Sweeney, of Baltimore, Md., read the following paper:

DENTAL LEGISLATION.

Probably every dental law on the statute-books of the world *purports* to be designed to promote a higher standard of education among dentists, and to protect the public from empiricism. Against laws designed only to accomplish such results no objection could well be made, save by the ignorant and charlatans; but as it cannot be shown that they comprise all those who criticise certain features of dental legislation unfavorably, it becomes pertinent to inquire closely, in order to discover the cause or causes of the persistent discussion carried on, both in essays and in private conversation, concerning this subject.

Not long since the DENTAL COSMOS congratulated the profession upon an apparent tendency in the meetings of the more prominent dental associations to devote less attention to such matters as ethics and legislation, and more to the problems of actual practice, which was commended as evincing a disposition to give prominence to topics of especial interest to the class described as "those who practice dentistry from the standpoint of the bread-winner;" and yet it would be hard to imagine anything of greater importance to that particular class than the laws which regulate dental practice.

The matter of first moment to the large number of new graduates who enter the profession each year is to find suitable places to locate; and as they scatter abroad they are often, and sometimes most unpleasantly, reminded of the importance of dental legislation, for wherever they may go, from Maine to Texas or California, in Canada or beneath the Southern Cross, in Europe or at the extremity of the Dark Continent, or among the distant islands of the Orient, they will find few places, indeed, where it does not confront them. In some it is an impassable barrier; in many, a cause of serious delay and apprehension; in *all*, the reflection remains that the dentists already established, not the public, have made it, and that *they*, not the civil authorities, are ever the most active and unrelenting in urging its enforcement, no matter how just or unjust may be its provisions.

The writer knows of no record in the world showing that the public of any community ever asked for legislation to regulate dental practice, however much provocation they may have had to do so ; hence the dental profession alone would seem chargeable with its defence and vindication ; and while some good result may be claimed, it would be a hopeless task to attempt to prove that dental laws have not been, sometimes, made the instruments of abuse and oppression, while the tendency to construe them arbitrarily is quite common.

Had dental laws and examining boards been so numerous in the years which immediately followed the opening of the colleges, they would have been a decided check to the rapid advance of dentistry, and the high estimation in which the American dentist is held in many foreign countries would have been an impossibility if the early pioneers had been confronted by some such laws as are in force to-day, enacted, perhaps, under the cloak of acts to protect the public against incompetence, but *designed* to protect the dentists in practice against competition.

Many of you remember, with pleasure, the honors bestowed upon the late Dr. Maynard in Europe, while the names of many others who have attained to positions of eminence there are familiar to all ; but is it a pleasing reflection that the most gifted among them, if alive to-day, would not be allowed to commence practice in England?

Why should that be? Have the English so far surpassed us in dental education that not only the average, but *no* American graduate can fulfill the requirements expected of a practitioner in England to-day? If that be true, then their law is perfectly reasonable ; but if there be other motives, the authors of the law can best explain them, and we may see, presently, who some of those authors are and where they were educated.

Laws ought to be *reasonable*, above all things. The eminent jurist, Lord Coke, said, "Reason is the life of the law,—nay, the common law itself is nothing else but reason ; which is to be understood of an artificial perfection of reason, gotten by long study, observation, and experience, and not of every man's natural reason, for *Nemo nascitur artifex*. This legal reason *est summa ratio*, and, therefore, if all the reason which is dispersed into so many several heads were united into one, yet could he not make such a law as the law of England is ; because, by many successions of ages, it hath been fined and refined by an infinite number of grave and learned men, and by long experience grown to such perfection for the government of this realm, as the old rule may be justly verified of it, *Neminem oportet esse sapientiorem legibus ;* no man (out of his own private reason) ought to be wiser than the law, which is the perfection of reason."

Three hundred years have passed since that was written, and they have not sufficed to alter the form and truth of the great lawyer's statement in the least ; yet, when measured by that standard, many specimens of legislative enactment will be found sadly wanting, as reference to another high authority will show.

Sir William Blackstone, who came two hundred years after Lord Coke, said, "The common law of England has fared like other venerable edifices of antiquity, which rash and unexperienced workmen have ventured to new-dress and refine, with all the rage of modern improvement. For to say the truth, almost all the perplexed questions, almost all the niceties, intricacies, and delays (which have sometimes disgraced the English, as well as other courts of justice) owe their origin, not to the common law itself, but to innovations that have been made in it by acts of Parliament, 'overladen' (as Sir Edward Coke expresses it) 'with provisos and additions, and many times on a sudden penned or corrected by men of none, or very little judgment in law.' "

All dental laws must be considered "modern improvements" or "innovations," if viewed from Blackstone's standpoint; and as they unquestionably give rise to much discussion, there is great likelihood that they bear traces of the unskillful handing of "rash and unexperienced workmen" and "men of none, or very little judgment in law," if nothing worse, for laws differ widely in effect of justice and usefulness in proportion to the degree of intelligence, disinterestedness, and honesty of purpose, or the lack of these qualities, displayed by those instrumental in procuring their enactment. Such of them as are honestly designed to furnish even justice to all require simply care and intelligence in preparation, and, being free from "perplexed questions, niceties, and intricacies," do not occasion protracted discussion after taking effect, but those designed to accomplish any covert ends are certain to evoke protests.

The dental laws of the United States almost equal the number of the states and territories. Decidedly the majority of them are of recent date, which fact shows that there has been a considerable increase of this class of legislation lately. A notable example of zeal, either to be in the fashion or to protect "the dear public" from ignorant pretenders, even while said public was still in the embryonic state of *boomerhood* (if a term may be coined for the occasion), was furnished by Oklahoma, which was supplied with a dental law almost as soon as with a territorial existence.

For convenience, all our laws may be divided into two groups: a large one which admits the holder of a degree from a reputable college to practice without examination, and a small one which does not. Why such laws as are deemed suitable in many states are not suitable in a few, your essayist is utterly unable to explain.

Among the agencies which have served to advance dentistry to the position which it now holds among the liberal professions, nothing has ever been considered as at all approaching in importance the establishment of legally chartered colleges, empowered to confer degrees upon their graduates; and volumes might be filled with the eloquent tributes of praise which have been paid to the memory of those men who so freely gave of their time, their means, and their best thought to the accomplishment of the design which they were clear-sighted enough to see would grow into something of inestimable benefit to mankind; and though it is, unfortunately, true that they have had a few unworthy imitators, no one will dare to assert that they have not had many worthy successors, or that the colleges have not exerted an immense influence for good, and but little is hazarded in the expression of the belief that the vast preponderance of sentiment in the dental profession to-day is in favor of the recognition of a degree from a reputable college as sufficient evidence of the holder's fitness to practice anywhere in our common country.

A recent writer on this subject, known to many of you, said, "As a general proposition, any future practitioner should enter the profession through the door of a reputable and established college.'' Of the colleges he said, ''The position and work of the colleges are the bulwark and defense of dental education ;'' while of the laws, as expressed in the examining boards, he said, ''The position of the examining boards is a direct outgrowth of law. The law, as such, has nothing to do with the betterment of instruction, but is the exercise of a police power by the state for the protection of its citizens.'' He might have been excused if he had written *should be* the exercise of such a power.

Those who agree with the views just quoted as to the propriety of future practitioners entering the profession through the college doors, might well stop to consider the probable effect of such a law as that of Massachusetts, for instance (unless recently amended), which ignores a degree and demands an examination of the graduate and non-graduate alike. Such a study would be very apt to lead up to attempts to secure the passage of laws which would give some attention to ''the betterment of instruction,'' and would be, in many respects, better than the law just alluded to, which is, really, a very poor specimen of legislation for a commonwealth which claims the credit of having furnished model laws.

In some states, Virginia for example, the law requires the candidate for examination to apply only at a certain time ; and the inference is that if he does not, or cannot, apply at such time, he cannot practice until the next stated period. Such a provision suggests the inquiry whether the law was made for the examining board or the board for the law, and an illustration of its working will be presented below.

Since the adoption of the three years' course by many of the colleges, some of the laws recently passed only recognize the degrees of such colleges as require three years of attendance as entitling the holders to the privilege of engaging in practice without examination, which is, in itself, a perfectly proper provision, but to attempt to force from that reasonable provision a construction which would deprive a graduate of one of these colleges, who graduated prior to the adoption of the three years' course, of that privilege, would not only be exceedingly arbitrary and unjust, but most ridiculous, as it would extend to the graduate of only a week's standing what would be denied to a man of ripe experience.

The *Items of Interest* lately said, ''Dr. W. S. Elliott, well known as one of our best and ablest men, has answered four hundred written questions for the privilege of practicing in Trenton, N. J. We have learned of a good and able man in Massachusetts whom its unjust law has fallen upon, and put under bonds not to practice. He did not feel called upon to submit to the imposition. He has 'grit,' and it will be interesting to see how it will come out.''

Without going into needless details, it may be plainly stated that any one who will take a small amount of pains can find, in our numerous laws, any number of ''perplexed questions, niceties, and intricacies,'' which it will not require a Blackstone to discover.

One cause of this is that, as in many other affairs, the many have allowed the entire management to fall into the hands of the few, and the result has been laws expressing the views of the few, not the many ; and while the majority of those who have have tried their hand at law-making doubtless tried honestly to accomplish something good and useful, some have lacked skill and experience, some have been visionary, and, as we always find, a few have gone into it for their own personal ends, and the result has been what might been expected, unsatisfactory.

Lack of uniformity in our laws, and the disposition to maintain a few which ignore all college degrees and all certificates, are the cause of much annoyance, and one unpleasant effect is seen in the peculiar position into which certain members of the National Association of Dental Examiners have been forced. Though made up from the various state boards, and meeting, necessarily, only on terms of the fullest equality, the Massachusetts member has been compelled to ignore the certificate signed by his colleague from the Empire State, and the member from New Jersey has had to extend the same delicate courtesy (?) to the certificate bearing the signature of his brother officer from Pennsylvania, which must be trying to gentlemen who claim to recognize the obligation of the code of ethics.

So keenly has the need of greater uniformity in our laws been felt that the president of the American Dental Association recommended it in his annual address in 1892. His address was referred to a committee of eminent gentlemen, who reported that, "With reference to the unification of state laws regulating the practice of dentistry, while desirable, it could not be hoped for, unless the profession was willing to level downward rather than upward"; but, unfortunately, they failed to indicate any law which would, in their judgment, serve as a model toward which to "level upward." Less than two years have passed, and yet the announcement has already been made that the National Association of Dental Examiners will adopt some measure for interstate registration at their next meeting, so the recommendation of the president of the American Association seems likely to prevail, in part at least, over the doubts of the committee.

Since many of the present laws are faulty, they should be amended, or replaced by better ones. Every effort should be made to render them a real protection to the public against impostors and charlatans, who simply aim to get the victim's money in the easiest and quickest manner, and entice the unthinking by high-flown promises impossible of fulfillment; but nothing which can be distorted into a menace to the graduate starting in practice, or the competent and well-meaning practitioner from another state, should be tolerated.

While examining boards may be necessary, their powers, at present so vaguely outlined, should be as clearly defined as their duties, for it is a mistake to allow them to be rendered autocratic; and as every executive officer in the land, including the chief executive himself, may have his official actions inquired into, and the decision of every court, save one, is open to appeal, surely it is not unreasonable to contemplate the assignment of some limit to the powers of a dental examining board, since only by such means can danger be avoided; and no man who accepts such a position in the proper spirit, namely, with the idea that while he holds it he is the servant of the public and the profession, not the master, need object to such a proposition.

That there is an element of danger in a law which, practically, confers absolute authority on a small body of men, appointed by an executive who frequently knows little more about them than does "the man in the moon," is so plain that those who fail to see it might well be classed with those of whom it is written, "None so blind as those who will not see."

Having hinted, in a general way, that dental laws have proved oppressive and been a means of abuse in some cases, it may be well to present some illustrations, in order to escape a charge of having made groundless assertions.

A young gentleman who graduated in Baltimore two years ago, and who gave evidences to a committee made up outside of the college faculty for the purpose of awarding class prizes, of the possession of more than average ability, told the writer subsequently that he had missed an unusually favorable opportunity to locate in Virginia, simply because there was no meeting of the examining board to be held until several months after he learned of the opening, and no provision in the law to cover the interval. He was perfectly willing to be examined, and would have passed any proper examination with credit, but the law did not meet his case; so he lost, possibly, the opportunity of his life through fear of prosecution. He *may* have been over-timid, but if he read the law aright, his timidity should justify its damnation, for no fair-minded man can admit that it is a proper function of law to terrorize those who are willing to be law-abiding.

As it is more agreeable to consider the faults of our neighbors than our own, let us now glance at a few illustrations of the practical working of some of the foreign dental laws.

Most of you know, doubtless, that it is now impossible for any one to commence practice in England under an American degree, owing to a recent change in the law, brought about (if your essayist's recollection be correct) at the instance of some *seventeen* practitioners. For some time previous the degrees of *two* of our colleges were recognized. A London practitioner, who is a native American and an American graduate, advised a young man, who had graduated in Baltimore and gone over there to practice, to hurry back and take another degree, either from Harvard or Ann Arbor, "because," said this brilliant exponent of everything ethical, "we are soon going to shut down on the whole business."

Dr. E. M. Flagg, formerly a member of the faculty of the New York College, went to South America several years ago, and in a letter from there he says, "The laws relating to dental practice are more rigid in Uruguay than in the Argentine Republic. I have done much to improve matters in that respect in Montevideo, and last year succeeded in getting legal recognition for the American degree, Doctor of Dental Surgery. By using all diligence, I do not think one could get an examination here in less than six months, so tortuous is the road required to put you in position to demand an examination."

Contrast Dr. Flagg, who worked to prepare the way for his colleagues, with the man who identified himself with those who proposed to "shut down on" his own countrymen.

Another gentleman of large experience in South America was very outspoken. After recounting his travels, which had included Chile, Peru, Bolivia, Argentine, Paraguay, and Brazil, he said, "I know of no country where better fees are obtained than in the Argentine Republic, but it has two drawbacks for an American. First, a knowledge of the Spanish language is imperatively necessary for passing an examination, which must be passed in order to practice; and, secondly, the delay in being able to obtain a hearing. The officials are careless as to your interests, and put you off from time to time, until both money and patience are oftentimes entirely exhausted. I knew one dentist to be *two years* before he was able to get an examination. I have often thought that the dentists in Buenos Ayres have clubbed together and bribed the examiners to disappoint newcomers.''

Other testimony of those who have passed examinations in those countries tends to show that generally, if not always, the examiners are medical men, not dentists, and that so far as the examination tending to disclose the applicant's fitness to practice dentistry is concerned, it is a perfect farce.

The chief of police of one of the large German cities said to the writer some years ago, ''While I am satisfied that you are a graduate of a well-known college in America, and are competent, and while, personally, I should be glad to see you established here, if you wished it, yet, if some of the other dentists here should complain of you, as they surely would, I should have no option, but would be compelled to enforce the law against you.''

While subsequently questioning one of those ''other dentists'' about a party who had on his sign ''Americanischer Zahnarzt,'' he said, ''Oh, he don't amount to anything; he is no real American graduate; he has only been in America. I could break him up if I wanted to; but he don't know anything about dentistry and won't do any harm; so I let him alone.''

The *Items of Interest* lately contained the following: ''Some American dentists have, by their abominable methods, brought reproach on American dentistry in Europe. We need not, however, believe that to be the reason European nations are excluding Americans from registration. There is a more potent reason. (For '*potent*' read '*pocket.*')''

The truth of this matter is as plain as daylight, and no device of sophistry will serve to mislead any one who will simply look. Foreign dentists dread the high reputation of the Americans, and they propose to shut them out, as a pure matter of business policy. It may be some comfort, in certain cases, to resort to argument to attempt to reconcile such a course with the requirements of professional ethics, but the case is too plain to admit of more than one construction.

If we propose to apply the same principle in our own legislation, and erect a wall around each separate state, keeping the sentinel ever standing at the entrance to repel his brother from without, perhaps the best thing would be to revise or destroy the code of ethics; but if we wish to avoid ''even the appearance of evil,'' we had better revise our laws carefully.

The world accords to the United States the first place in dentistry, hence it is but natural that the world should look to us to set the example in all needed measures of reform. To us belongs the credit of having established the present system of dental education, likewise that of journalism and professional association, or, as the president of the late Columbian Congress worded it, ''the erection of the great tripod on which all professional advancement must rest,—the college, the journal, and the association.'' Consequently it is eminently proper that from the United States should also come the impetus which may serve to so adjust the prop of legislation that it may strengthen and not tend to overturn the structure.

It will accomplish no good result to complain of the laws passed by foreign nations to exclude our graduates, even though they might admit doing so because they are afraid of them, so long as we countenance laws of our own similar in provisions or effects ; but when we shall have purged and purified our laws, and so framed them that they shall embody somewhat more of the spirit of the unwritten law of ethics, and more clearly reflect its obligation to exercise toleration and to recognize the rights of professional brotherhood, while they extend a more potent protection to the public against the charlatan, the rest of the world would observe, and, in time, will imitate, because we then will have deprived the foreigner of the strong argument that we legislate against our own institutions. The profession can rest assured, therefore, that in dental legislation they have by no means a dead issue or an exhausted subject. It is very much alive, it is growing, and its growth needs to be carefully watched and wisely directed. Properly cared for, it will grow into an object of beauty, which will shelter the public against much imposition, and cause the profession joy and pride in the youngest of its offspring ; but if neglected and allowed to grow only under the culture of the visionary, the unthinking, and a few actuated solely by self-interest, it will grow into an ugly and dangerous parasite, which will cast a shadow on our professional renown, and rob us, in the closing years of this nineteenth century, of a portion of the heritage bequeathed to us in its early decades by those men endowed with prophetic vision which enabled them to foresee the manifest destiny of dentistry.

As the time for clinics had arrived, the convention adjourned to the clinic-room, and the following clinics took place :

Dr. Chas. A. Meeker, of Newark, N. J., had presented two cases of teeth to bleach,—one of hard, dense enamel and dentine, and the other of softer material. His method of procedure was to first remove all carious matter, place the rubber-dam on the tooth to be operated upon and the two contiguous teeth ; then to apply ammonia-water and wash thoroughly with the same. Then use the twenty-five per cent. pyrozone in the cavities and outside, rapidly vaporizing the pyrozone either by hot or cold air blast, and so continue until the requisite whiteness is obtained. The first case, devitalized by a blow twelve years ago, was of a very stubborn nature, but the second, of softer dentine, readily responded to the pyrozone, and was considered white in about nine minutes. The first case, of very dense yellow material, took nearly an hour to approach the color of the adjoining tooth.

After the bleaching, a thin transparent varnish of sandarac or white shellac is used inside, then a thin coating of oxyphosphate followed by a filling of gold.

From the clinics given by Dr. Meeker before the First District Society in New York and in New Jersey, pyrozone is shown to be a valuable aid to the dentist in the bleaching of teeth, as the operation can be performed in from ten minutes to an hour ; and Dr. Meeker has had an experience so far of thirteen months with no subsequent change whatever.

Dr. F. C. Barlow, of Jersey City, N. J., demonstrated by a number of models his method of procuring adaptation of the Spyer cohesive forms as applicable to rubber dentures.

By the aid of the models were shown the different stages, from the impression to the perfect die, upon which the vulcanized plate was formed. Finished plates were shown, with the forms attached, in gold and other metals.

Dr. A. L. Pennel, of Leesburg, Va., operated on a case where the left inferior second molar required a compound filling, embracing grinding and anterior approximal surfaces. Non-cohesive gold was used for the first two-thirds, and this was finished with cohesive gold foil, making a very solid filling.

(To be continued.)

CONNECTICUT STATE DENTAL ASSOCIATION.

THE thirtieth annual meeting of the Connecticut State Dental Association was held at Hartford, May 15 and 16, 1894. The following gentlemen were elected officers: Dr. Chas. P. Graham, of Middletown, president; Dr. Clinton W. Strang, of Bridgeport, vice-president; Dr. Geo. L. Parmele, of Hartford, secretary; Dr. Daniel A. Jones, of New Haven, treasurer; Drs. Charles McManus, C. C. Barker, and W. H. Rider, executive committee.

Mr. Charles T. Wells, son of Horace Wells, the discoverer of anesthesia, was unanimously elected an honorary member. The following gentlemen, having been in practice in the state over fifty years, were elected active members for life: Drs. S. J. Tuller, J. A. Pelton, Geo. H. Waters.

Papers were read by several of the members, and by Dr. Thomas C. Stellwagen, of Philadelphia, Dr. C. E. Francis, of New York, and Dr. Marfield, of Holyoke.

The association publishes monthly a bulletin for distribution among the members.

The following resolutions were introduced by Dr. Jas. McManus:

> *Resolved*, That the members of the Connecticut State Dental Association, in commemorating the semi-centennial of the discovery of anesthesia, feel it a duty to briefly restate and publish a few facts, so that the present and future generations may know the truth regarding it. In the ages past, many men may have given one or more drugs with the hope of giving freedom from pain during surgical operations, but the fact is indisputable that Dr. Horace Wells, of Hartford, Conn., was the first man to deliberately take, by inhalation, an anesthetic, and to persistently after proclaim to the world that a surgical operation had been performed on him without pain while under the influence of nitrous-oxid gas (an anesthetic), December 11, 1844.
>
> While we would not detract from, but willingly give all due credit to the men who have, since that memorable day, introduced other more powerful and dangerous anesthetics, and which for a time were so successfully forced upon the public by the recommendations of the medical fraternity that the safer anesthetic discovered by the dentist, owing to his early death, was nearly stamped out and humanity for many years was deprived of its use and its blessing, until it was again taken up by Connecticut dentists, and its value as a safe anesthetic proved daily in thousands of operations since 1863.

The physicians and surgeons of the city of Hartford united in a testimonial declaring their belief in the justice of the claims of Dr. Wells, in 1845 and 1846.

The General Assembly of Connecticut, in 1847, passed resolutions in favor of Dr. Wells as the discoverer of anesthesia, and declared that he was entitled to the favorable consideration of his fellow-citizens and to the high credit of a public benefactor.

The Court of Common Council of the city of Hartford passed resolutions to the same effect.

In France, the medical society in Paris, January, 1848, voted, "to Dr. Horace Wells, of Hartford, Conn., is due all the honor of having first discovered anesthesia."

The state of Connecticut and the city of Hartford, with the added contributions from citizens of this and other states, have had placed in Bushnell Park, in Hartford, a portrait statue in bronze of Dr. Horace Wells; and the past year the Board of Dental Commissioners have had stamped on their certificates of registration and license a seal on which is a medallion head of Dr. Wells, to remind all dentists in this state of the honor due to his memory.

The public should not be allowed to forget that the simple, honest, Christian desire of this dentist was to give his discovery to all to be "free as the air we breathe," and his course in regard to it stands out grandly when compared with the extortionate plans laid by all other vendors of secret anesthetics, for the use of which they demand of suffering humanity an unjust tribute.

Drs. Geo. L. Parmele, Jas. McManus, and Civilion Jones have been appointed a committee to arrange for the semi-centennial celebration. It is proposed to have a banquet and to place a memorial tablet to mark the spot where the first operation under an anesthetic was performed.

ILLINOIS STATE DENTAL SOCIETY.

At the thirtieth annual meeting of the Illinois State Dental Society, held at Springfield, May 8–11, 1894, the following officers were elected for the ensuing year: J. W. Cormany, Mt. Carroll, president; S. F. Duncan, Joliet, vice-president; Louis Ottofy, Chicago, secretary; W. A. Stevens, Chicago, treasurer; Grafton Munroe, Springfield, librarian. The next meeting will be held at Galesburg, May 14–17, 1895.

Louis Ottofy, *Secretary*,
Masonic Temple, Chicago.

WOMAN'S DENTAL ASSOCIATION OF THE UNITED STATES.

The regular meeting was held June 2, 1894, at 1300 Arch street, Philadelphia; the president, Dr. Anna T. Focht, in the chair.

Dr. Bertha Jarrett read a paper on "Local Anesthesia." The discussions brought out special denouncements on the "local anesthetic man" who works so much havoc in various communities.

The next meeting will be held September 1, 1894, at Dr. Focht's office, Broad street and Columbia avenue.

Emily W. Wyeth, *Corresponding Secretary*,
3920 Fairmount avenue, Philadelphia, Pa.

DENTAL COLLEGE COMMENCEMENTS.

UNIVERSITY OF PENNSYLVANIA—DEPARTMENT OF DENTISTRY.

The fifteenth annual commencement of the Department of Dentistry of the University of Pennsylvania was held at the American Academy of Music, Philadelphia, on Thursday, June 7, 1894.

The valedictory address was delivered by Louis A. Duhring, M.D., professor of skin-diseases.

The number of dental matriculates for the session was two hundred and thirty-one.

The degree of D.D.S. was conferred on the following graduates by William Pepper, M.D., LL.D., provost of the university:

NAME.	STATE OR COUNTRY.
Antonia d'Avila	Brazil.
Miles C. Barner	Pennsylvania.
Marcel Barral	France.
John R. A. Berry	Switzerland.
George R. Blanchard, Jr.	Pennsylvania.
Hans Block	Germany.
Frederick L. Bogue	New Jersey.
Frederic H. Bowers	Illinois.
D. Paton Boyd, L.D.S.	Scotland.
Harry B. Butler	New York.
John J. Cush	Pennsylvania.
F. A. Delabarre, A.B.	Massachusetts.
Wilson D. DeLong, M.D.	Pennsylvania.
John Dunlop, L.D.S.	Scotland.
Theodore C. Edgar	Iowa.
Rudolph Erler	New York.
George H. Finch	Virginia.
Harley B. Fowler	Wisconsin.
Martin Freund, Ph.D.	Germany.
Mendel Friedland	Russia.
Lewis H. Gilman	Pennsylvania.
August Hafner	Switzerland.
Wilhelm Harres	Germany.
J. Irvin Hatch	Pennsylvania.
E. Foster Hazell	Illinois.
Joseph M. Hill	Pennsylvania.
John E. Horgan	Pennsylvania.
Raymond W. Hunter	Massachusetts.
Arthur T. Kenney	Australia.
Emil W. Kuehn	Minnesota.
Robert Lavanchy	Switzerland.
Frederick A. Lewis	Iowa.
Marquis D. Littig	Iowa.
J. T. Lippincott, D.D.S.	Pennsylvania.
George E. Longeway	Canada.
Harry G. Maize	Pennsylvania.
Edward J. Marfing	Pennsylvania.
Walter S. Marlow	England.
H. B. Matteossian, A.B.	Turkey.
Carl Mosberg	Germany.
Albert Newgarden	Pennsylvania.
Peter O'Donnell	Pennsylvania.
John P. Oliver, L.D.S.	England.
Thurlow G. Patterson	New York.
Charles F. Portz	Pennsylvania.
J. Martin Raugh, D.D.S.	Iowa.
Guy C. Robb	Pennsylvania.
John A. Robeson	N. Carolina.
Walther Rosendahl	Germany.
Ernst Rosenthal	Germany.
Philip H. Seibel, M.D.	California.
Lourival M. de Souza	Brazil.
D. Ambrose Stein	Pennsylvania.
Charles E. Stine	Pennsylvania.
John W. Storer	West Virginia.
Campbell C. Taggart	Pennsylvania.
Howard S. Taylor	Delaware.
Fred. M. Thiesen	Germany.
Harold Tyndale	Pennsylvania.
Victor de Trey	Switzerland.
Arthur D. Weakly	Illinois.
B. Frank Witmer	Pennsylvania.
William J. Wray	Pennsylvania.
Wilson Zerfing	Pennsylvania.

June 16, 1893.

NAME.	STATE.
Joseph M. McDowell	Pennsylvania.

CHICAGO COLLEGE OF DENTAL SURGERY.

The twelfth annual commencement exercises of the Chicago College of Dental Surgery (Dental Department of Lake Forest University) were held in the Columbia Theater, Chicago, Ill., on Monday, April 30, 1894, at 2 P.M.

The valedictory was delivered by George H. Denison, and the address to the graduates by John M. Coulter, Ph.D., LL.D., president of the university.

The number of matriculates for the session was three hundred and sixty

The degree of D.D.S. was conferred on the following graduates by Truman W. Brophy, M.D., D.D.S., dean of the faculty :

NAME.	STATE OR COUNTRY.
Carl O. Bauth	Illinois.
Frederick H. Burkhardt	Illinois.
John R. Brown	Illinois.
Frank H. Baker	Illinois.
Herbert B. Cole	Michigan.
Ewald H. Czolbe	Illinois.
Arthur P. Davis	Wisconsin.
George H. Denison	Indiana.
Arnold E. Dick	Hungary.
Orlan T. Eddy	Illinois.
Walter W. Eberhart	Minnesota.
George H. Edgerton	Illinois.
Eno L. Fickensher	Illinois.
William C. Gowan	Canada.
Robert C. Gebhardt	Wisconsin.
Joseph E. Grattelo	Illinois.
George W. Harris	Minnesota.
Franklin R. Houston	Wisconsin.
Alfred L. Haas	Iowa
David A. Hare	Canada.
Ralph W. Harrold	N. Dakota.
Albert M. Harrison	Illinois.
Fred John R. Hemple	Michigan.
Edward H. Hickman	Illinois.
Charles W. James	Illinois.
John W. Johnson	Canada.
John K. Kane	Illinois.
Carl R. Kuderling	N. Dakota.
George R. Lee	Illinois.
B. J. La Grange, M.D.	California.
Samuel E. Leece	Wisconsin.
Elsie H. Leib	Illinois.
Charles C. Mann	Washington.
Alexander O. McBean	Wisconsin.
Arthur D. O'Neill, Jr	Illinois.
John E. Pollock	Illinois.
Milton B. Pine	Indiana.
Ceylon Rossman	Minnesota.
Jasper M. Revel	Canada.
Ruger C. Stevenson	Wisconsin.
Frederic B. Skillman	Illinois.
William F. Saunders	Wisconsin.
Chester G. Stinson	California.
Thomas Sheridan	Illinois.
Floyd Sykes	Wisconsin.
Frank Smith	Illinois.
Alfred B. Sargent	Minnesota.
Charles L. Thomas	California.
Lewis P. Voss.	Illinois.
Charles G. R. Wright.	Illinois.
George W. Winslow	Indiana.
John J. Wright	Wisconsin.
Joseph S. Wright	Missouri.
Henry L. Whipple	Illinois.
Simon F. Wilhelmi	Illinois.
Thompson F. Wheat	Illinois.
Charles M. Wesner	Illinois.
Charles H. Wylie	Wisconsin.

DENTAL SOCIETY ANNOUNCEMENTS.

American Dental Association.

The thirty-fourth annual session of the American Dental Association will be held at Old Point Comfort, Va., commencing at 10 A.M., Tuesday, August 7, 1894.

Geo. H. Cushing, *Recording Secretary.*

Arrangements are under way, but have not yet been completed, for a reduction in railroad fare. We expect a reduction of one and one-third for the round trip on the "certificate plan." In order to get this reduction, full fare must be paid in going to the meeting, and a receipt taken therefor from the ticket agent at the starting-point. This receipt (certificate) must be countersigned by the secretary of the association at the meeting, and will enable the holder to return for one-third fare, provided one hundred certificates are presented, showing that at least that number have paid full fare on the various railroad lines entering the place where the meeting is held.

A circular giving full particulars will be mailed later to all members and to those who apply for information.

J. N. Crouse, *Chairman Executive Committee,*
2231 Prairie avenue, Chicago, Ill.

AMERICAN DENTAL ASSOCIATION.

OPERATIVE DENTISTRY—SECTION III.

MEMBERS of the American Dental Association who wish to present anything of interest that would properly come before Section III, will please communicate at once with the chairman of the section,

A. W. McCANDLESS,
1205 Champlain Building, Chicago, Ill.

SOUTHERN DENTAL ASSOCIATION.

THE annual meeting of the Southern Dental Association will be held at Old Point Comfort, Va., from Thursday, August 2, 1894, to Monday, August 6, inclusive. An interesting meeting is anticipated, and a hearty welcome will be extended to all members of the profession.

B. HOLLY SMITH, *President.*

NEW JERSEY STATE DENTAL SOCIETY.

THE New Jersey State Dental Society will hold its twenty-fourth annual convention at the West End Hotel, Asbury Park, commencing 10 A.M., Wednesday, July 18, and continuing the 19th and 20th. The chairmen of the several committees have been very successful in obtaining the services of prominent men in the profession for papers and clinics, and the exhibits of everything new and useful pertaining to dentistry will be more than usually large and varied. The accommodations are first-class, and the hotel rates will be reduced. Meet with us and you will receive a Jersey welcome.

CHAS. A. MEEKER, D.D.S., *Secretary,*
29 Fulton st., Newark, N. J.

MAINE BOARD OF DENTAL EXAMINERS.

THE Maine Board of Dental Examiners will meet for the examination of applicants, at Rockland, on Wednesday, July 18, 1894, at 2 o'clock P.M.

D. W. FELLOWS, *Secretary.*

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EDITORIAL.

THE MEDICAL AND DENTAL ACTS OF PENNSYLVANIA.

TEN years of persistent agitation has resulted in the passage of a carefully considered and judicious act of assembly for regulating medical practice in Pennsylvania, approved by the governor on May 18, 1893, and which during the present month has been put into practical operation. For a number of reasons this new law is worthy of thorough study by all who are interested in the matter of dental legislation. The principles involved and the ends sought to be attained are those most desirable for effective regulation of the practice of dentistry ; and inasmuch as the framers of the medical bill have been confronted with an exactly analogous problem, we may derive benefit from the precedents which they have established in successfully disposing of many of the obstacles which have heretofore stood in the way of satisfactory legislation for both medicine and dentistry.

The problem as related to medicine was much more complex than that of dental legislation, in this respect, that equitable recognition of the rights of not less than three distinct schools of medical practice had to be provided for,—viz, "one representing the Medical Society of the State of Pennsylvania, one representing the Homœopathic Medical Society of the State of Pennsylvania, and one representing the Eclectic Medical Society of the State of Pennsylvania." As dentistry is practically free from sectarian divisions, this complicating and disturbing factor fortunately does not have to be included in its legislative problem. Under the somewhat vaguely defined, though clearly recognized, constitutional right known as the police power of the state, legislative enactments for the regulation of medical and dental practice exist in practically all of the states and territories of the United States. Such enactments have become a part of the organic law of the country, and it may be safely asserted that the right of the states to so legislate by virtue of their police powers is admitted by all. Whatever exceptions to dental legislation may be taken must therefore be with regard to particular provisions of the laws, and not as to the authority of the state to enact them. In nearly all attempts at securing equitable legislation regulating dental practice, some one or all of the following difficulties have presented themselves :

1. The adjustment of the relations of the educational function of the colleges and the licensing function ;
2. The creation of a competent and satisfactory Board of Dental Examiners ;
3. The specific limitation of the authority and definition of the powers of such a board ; and
4. Interstate recognition and acceptance of the licensees under the several State Boards at a uniform standard of qualification.

The abrogation of the chartered right of the colleges under the old system giving them the power to license their graduates to practice, and vesting the licensing power exclusively in a State Board of Examiners as provided for in the new medical act of Pennsylvania, has given rise to much controversy, and has naturally met with strong opposition from the colleges thus deprived. It has been asserted that such action could not be legally sustained, on the ground that the state cannot break its contract with the colleges giving them the right to license. This question has not been tested in the courts, and probably will not be, for good authorities hold that by virtue of its police power the state may enact any laws for the better protection of the health and lives of its citizens, even though such legislation should incidentally involve the breaking of special individual contracts previously entered into for the same object. The vesting of the licensing power in a State Board of Examiners is not only defensible upon legal grounds, but when a sufficient trial of its practical workings has been had there cannot fail to be a general recognition of its equity and value, provided that a proper system for intelligently carrying out the spirit of the principle which it involves is included as an essential feature of the plan.

The right of the state, under its police powers, to legislate for the protection of the health and lives of its citizens is absolute, and can only be controverted when it has been arbitrarily exercised, or where unjust discrimination can be shown. The enactment of laws regulating the practice of all branches of the healing art is, therefore, a reasonable exercise of that right, and the spirit and intent of all such legislation is to protect the citizens of the state against ignorant and incompetent service.

In conferring the right to license practitioners upon the college that graduated them, the state transferred to the college its right in that respect, and to the same degree its proper function in the protection of its citizens.

It is quite true that the faculties who are the educators of the students should be fully, or even most, competent to decide upon the fitness of graduates for their high vocation ; but so long as colleges are conducted upon present business principles, and while their chief source of revenue is from classes in which the faculties have a pecuniary interest proportioned to their size, the charge will always be made, whether just or not, that the monetary factor must have its weight in helping to swell the graduating lists by making the standard of graduation a movable quantity.

The separation of the licensing function from the business of educating students cannot fail to at once act as an important stimulus toward improvement in educational methods, and react favorably upon the college that establishes a reputation for most thoroughly fitting its students for the State Board examination.

It would, moreover, invalidate the charge that a successful college was run, primarily, as a money-making institution. It would make efficiency, and not easy graduation, the measure of popularity, and tend to eliminate, by the process of natural selection, institutions whose standards are below the recognized limits of reputability. The Pennsylvania medical act meets this issue squarely, and is mandatory in its provision that all graduates in medicine within the state shall have their fitness to practice tested by a written examination by the State Board before they can secure a license authorizing them to practice.

The creation of a competent and satisfactory board of examiners is manifestly essential for the successful operation of the system. It is of course desirable that an examining board shall be made up of the best material obtainable for the purpose. The medical act vests the appointing power in the governor of the state, but decrees that he shall make his selection from a certified list of the members in good standing of the state medical societies who have been in practice for not less than ten years. The state society thus becomes in a restricted sense the nominating body. It has been well said that the ability to intelligently examine a student is as much an art as it is to properly educate him ; that those who have given him his instruction are by reason of that fact the ones best qualified to estimate the extent of his knowledge ; and as members of college faculties are, for obvious reasons, debarred from election to examining boards, no board equal in competency to the college faculty can be created. While this need not be questioned, it must be borne in mind that the examining function is not taken away from the college faculties under the present system, though its objective feature is wholly modified. The power to license, when vested in the State Board, has been eliminated as the principal object of the faculty examination, the function of which is now only to determine the fitness of the student as a candidate for the licensing examination of the State Board. But, again, it is objected that even a well-qualified graduate may, through the stupidity, lack of experience, personal prejudice, or numerous other alleged defects in the members of a board, fail to pass, and so be debarred from his right to practice. This objection rests on a tangible basis only where an examining board is given unrestricted discretionary power, and its examinations are conducted as star-chamber proceedings, not open to inspection or supervision, and where the right of appeal from its findings, or any equivalent of that right, is not granted to the student. The appointment of a board with unlimited discretionary power, no matter how able or how unimpeachable the integrity of its members may be, is not only an unwise proceeding, inconsistent with sound business and legal principles, but is unjust to the board itself. The law should define with clearness and precision all the functions and duties of the board, so that all of its acts shall have specific legal warrant in harmony with the spirit of the law the provisions of which it is their duty to execute, so that all of its acts may be free of subsequent criticism. If this feature is developed and the provisions of the law pertaining to it are carefully and explicitly stated, the matter of how the board shall be created, or in fact constituted, becomes of secondary importance.

The provisions of the medical act and those of the corresponding dental act of Pennsylvania with respect to this feature are in strong contrast. The medical act provides "that all examinations shall be conducted in writing, and shall be upon certain specified subjects; that after each examination the board shall without unnecessary delay act upon the same and make a report to the Medical Council of the State, signed by the president, secretary, and each acting member of the board of examiners, stating the examination average of each candidate in each branch; the general average and the result of the examination, whether successful or unsuccessful; the said report to embrace all the examination papers questions and answers thereto, and that all such examination papers shall be kept for reference and inspection for a period of not less than five years." The law also provides that the examining boards shall hold two or more meetings annually for the examination of candidates. The present law regulating dental practice in Pennsylvania, and which was passed three weeks after the corresponding medical act became a law, gives plenary power to the State Board of Dental Examiners, and seals their acts with the patent of autocracy by the following provision: "In all cases the members of the State Dental Examiners' Board shall, by written or oral examination, *or otherwise*, *satisfy themselves* as to the fitness and qualifications of the holder of a diploma before indorsement is made, *and in their discretion* refuse to indorse the diploma of an applicant who is found incompetent."

Such legislation, while it may have been conceived in the spirit of professional improvement, is iniquitous in its tendencies, and should be expunged from the statute-books. It gives to a few men constituting a board, whose personnel is frequently changing, the right to decide upon the qualifications and fix the destiny of men who have spent years and money in qualifying themselves for practice. It permits them to establish their own standards of qualification without supervision, let or hindrance. It does not require that they shall conduct their examinations in harmony with the standards of present educational requirements or of public necessity. It even goes so far as to provide that the board shall "satisfy themselves" as to the fitness and qualifications of the candidate, and in their discretion refuse to indorse, etc. It makes no provision for the satisfaction of any of the other parties in interest, apparently regarding this as a feature of no consequence so long as the board satisfies itself according to law.

It seems to be a necessary condition of all progress that it shall proceed by slow degrees, and be often impeded by imperfect efforts. In so far as the Pennsylvania dental law is a step toward state regulation of dental practice for the public good and the promotion of a higher standard, it is to be commended, and the feature which it embodies of authorizing the State Board to examine all candidates for license to practice is a step in the right direction ; but such a feature is worse than useless when coupled with a provision giving to the board unrestricted discretionary power, as it does by the insertion of the words "*or otherwise*" in respect to the methods of examination to be pursued, and then after directing that they shall satisfy themselves, invest them with autocratic powers as is done by the words "*in their discretion shall refuse to indorse*," etc.

The Pennsylvania medical act is in harmony with the spirit of equity and fairness which we are proud to call a characteristic of American institutions. Its ministrations are open to the scrutiny of the public at all times, and the work of its executive board, though not subject to appeal in the strict legal sense, is efficiently controlled through the openness of its proceedings by the higher appellate court of public opinion. As for the dental board, it is only required that they shall satisfy themselves.

The question of interstate recognition of licensees of the several State Boards, upon a uniform standard of qualification, is disposed of in the Pennsylvania medical act by a provision that applicants examined and licensed by boards of other states having substantially the same standard of requirements as those of Pennsylvania shall, upon payment of a stipulated fee, be admitted to practice without re-examination. This provision embodies all that can be legally done to secure interstate recognition of licensees. There is no analogy, as has been suggested, between interstate commerce legislation and the matter in question, for the latter is a question of state sovereignty in the exercise of its police powers, to which the former bears no direct relation. Hence the alternatives are a mutual agreement among all the State Boards to recognize the licensees of each, or the adoption of the plan embodied in the Pennsylvania medical law of recognizing those having standards in common.

The latter is the only practicable course, for the reason that standards of dental qualification must vary, as related to conditions and environment, precisely as do all other standards of human development. This being the case, the view of the committee of the American Dental Association having in charge the president's address of two years ago, that if the profession are determined to secure such interstate recognition they must be content to level downward rather than to level upward, does not appear to need any defence.

The only substantial progress that can be made in this way is for those states having the highest standard to mutually recognize the licensees of each, and exclude those who do not measure up to their requirements. The effect of this, in time, would be to raise the standard all around, involving a distinct gain to those of previously inferior standard ; while an opposite course would mean a positive loss to those of higher standard, and no gain to any one.

With respect to this important feature of dental legislation, the new dental act of Pennsylvania is silent. There is an apparent need for some thorough and careful work in this direction, which may be facilitated by the precedent and example furnished by the medical act of the same state.

THE MID-WINTER FAIR DENTAL CONGRESS.

THE dentists of the Pacific Slope have demonstrated their ability to inaugurate and carry out to a successful issue a meeting which will compare favorably with any similar effort elsewhere. The result is a grand success, both as to quality of work done and numbers in attendance. A determination to continue these meetings is evinced by the following resolution introduced by Dr. C. L. Goddard, and passed by the congress. Our Eastern practitioners will thus be afforded another opportunity to see the advanced ground taken by the Pacific-coast dentists, and it is an opportunity they cannot afford to ignore. We will publish a full report of the meeting in our August issue.

WHEREAS, The Mid-Winter Fair Dental Congress has proven a grand success ; therefore, be it

Resolved, That a Pacific Coast Dental Congress be held either in 1896 or 1897, at the discretion of the committee hereinafter provided for.

Resolved, That a general committee be formed as follows, viz :

1. Five members shall be elected by this congress by ballot without nomination.

2. Each dental society of not less than ten members, state or local, now in existence or hereafter formed with the code of ethics of the American Dental Association, each recognized dental college faculty, and each board of dental examiners on the coast shall have the privilege of electing one member for this committee for each twenty members of said society or fraction thereof.

Resolved, That this committee of five shall organize temporarily by electing a secretary, who shall notify each dental society, dental faculty, or board of dental examiners, to elect its members of this committee ; and that as soon as the committee is thus increased to fifteen members, the secretary *pro tem.* shall call a meeting for organization and election of permanent officers.

Resolved, That this general committee shall select the place and time of the meeting of the congress, appoint local committees, make all arrangements, transact all business, and six months before the time of meeting shall elect a president and secretary-general, who shall preside over said congress.

EXCESS OF MATTER.

WE are compelled, for lack of space, to defer until our next issue the publication of much interesting and valuable matter. Several important original communications, reports of societies, book notices, etc., are thus crowded out, besides the report of the San Francisco meeting of the Section on Oral Surgery of the American Medical Association, which has reached us as we are going to press.

OBITUARY.

DR. A. O. RAWLS.

Died, at Lexington, Ky., April 22, 1894, from the effects of an overdose of chloral, Albert O. Rawls, D.D.S., in the fifty-third year of his age.

Dr. Rawls was born at Wilmington, O., on the 8th of December, 1841. He commenced the study of dentistry in 1858, with Dr. John Doughty, of Connersville, Ind. In 1861 he entered military service in the rebellion in the Third Indiana Artillery, and served in the campaigns of the West and South until the latter part of 1864, when he returned to Connersville and entered upon the practice of his profession. In 1870 he graduated at the Ohio College of Dental Surgery, with which he was subsequently identified as an instructor. In 1872 he practiced in San Francisco and Chicago, and in 1873 he went to Lexington, where he continued in very successful practice up to the time of his decease.

The following action and resolutions of his confrères in reference to the life and career of Dr. Rawls attest the regard and esteem in which he was held by the profession and the community :

At a called meeting of the dentists of Lexington, Ky., on the 23d day of April, 1894, the following members were present : Drs. L. F. Huffman, T. D. Kelley, S. S. Johnson, C. G. Burgin, F. B. Bosworth, R. Y. Henley, S. A. Donaldson, H. L. Harlan, Lexington, and W. W. Justice, Winchester.

Dr. Kelley was appointed chairman, and Dr. Harlan secretary.

On motion, Drs. Huffman, Johnson, Henley, Donaldson, and Harlan were appointed a committee to draft the resolutions, which were as follows :

"Whereas, Death has taken from our midst, in the full prime of life and usefulness, a talented and exemplary member of our profession, Dr. Albert O. Rawls, whose career was crowded with vicissitudes ; but whether as a soldier battling for his country's existence, a student preparing for the battle of life, a professor teaching others to be self-sustaining, or practitioner in his honorable calling, he was always a man of honor and probity, carrying himself so as to earn the respect of his comrades in arms and his brethren in the dental profession, and the esteem and good-will of all who had the pleasure of his acquaintance. He was a charter member of the Kentucky State Dental Association, of which he was twice elected president, and was a member of the State Board of Dental Examiners. For years he was president of the Mississippi Valley Dental Association, and in the American Dental Association he was honored with office.

"In the presence of so sad a death, it is meet that members of the dental profession in this city of Lexington take some formal action, evidencing their unaffected sorrow at the loss which they have sustained.

"*Resolved*, By the dental surgeons present, that we deeply deplore the death of Dr. A. O. Rawls, regarding it as a personal as well as professional loss to us, as well as to his large clientage, and incidentally to the community.

"He was a valued citizen, and as a friend was faithful and true,—a devoted husband and indulgent father. He worked faithfully in his chosen field, and his efforts were crowned with success. To the younger members of his profession his course will serve as a stimulant to them to strive to reach the highest standard of excellence. He understood the demands upon him as practitioner and citizen, and responded fully to their requirements in every respect.

"*Resolved*, That we tender to the bereaved family of the deceased our heart-felt sympathy in their present grief, and that a copy of these resolutions be presented to them and also published in the city papers and dental journals."

H. L. HARLAN, *Secretary*.

HINTS, QUERIES, AND COMMENTS.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Dr. Thomas, in his invaluable articles on nitrous oxid gas, strongly deprecates the use of the "Hood Inhaler," so universally used in England.

Does Dr. Thomas use an inhaler with a shield to cover the lips? If so, how does he manage to see the lips? If no shield is used, how does he prevent the patient opening the lips and admitting air when it is not needed?

With an American inhaler is the nose closed by the thumb and finger of the administrator? and, if so, do patients object to it?

These may seem trivial questions; but success in "giving gas" greatly depends on attention to detail; and as every inhaler requires some little trick of management, I venture to think that information on these points will be of great service to any who, like myself, desire to profit by Dr. Thomas's teaching.

W. C. G., L.D.S.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a Thesis.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING MAY, 1894.

May 1.—No. 519,109, to THOS. G. and EDW. GARDNER. Dental chair.
" " No. 519,110, to THOS. G. and EDW. GARDNER. Retaining or lowering apparatus.
May 15.—No. 519,799, to WM. H. THRIFT. Light concentrator for dentists, surgeons, and others.
" " No. 519,845, to THEO. G. LEWIS. Gas regulator.
" " No. 519,984, to A. W. BROWNE. Pulley block.
May 22.—No. 520,072, to A. G. MCKEE. Pedal governor for electric motors.
" " No. 520,357, to Z. HAND. Dental appliance.
May 29.—No. 520,593, to OTTO F. HAGER. Tooth-brush.
" " No. 520,577, to ADAM SCHWAAB, JR. Head-rest.

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ORIGINAL COMMUNICATIONS.

PYORRHEA ALVEOLARIS.

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(Concluded from page 540.)

THERE yet remains the discussion of gout as an etiological factor in the production of pyorrhea alveolaris. The recent papers by Professor Peirce lend additional interest to this phase of the subject, and I must express my surprise at the lack of general information displayed by the advocates of this theory regarding the pathology and symptomatology of calcic affections. That there are cases of pyorrhea in which gout appears as a complication, I have no doubt; but as an etiological factor, I have grave doubts; and to go as far as Dr. Peirce has, and place this disease as the principal agent in the production of pyorrhea, is the very height of absurdity. In order not to be misunderstood, let us quote his words as they appear in print; and as they have not been denied, we are to presume that they are as he desires them to stand.

In the April number of the *Dental Practitioner*, page 55, after giving credit to calcic gingivitis, which he classes in another part of the same article as of minor importance, that "may be treated locally, and may be reported as a case of pyorrhea cured, when the most that can be said of it was that it was the result of a local cause and has been treated and cured by topical applications."

"The third," he says, "is a pericemental irritation commencing at or near the apical extremity of the root, due to the presence of some morbid composite of the blood, exuded with the plasma and infiltrating the alveolo-cemental membrane, and frequently deposited or precipitated upon the root of the tooth near the apex. This latter I *designate true pyorrhea alveolaris*, or hæmatogenic pericementitis, and so intimately is it associated with some other local manifestation of a gouty diathesis that I have believed and do now believe it to be but another local expression of that systemic condition. *This assumption* has been confirmed by the fact that the accumulation *which* *is so frequently found upon the roots of teeth*[*] near their apical extremity by careful chemical analysis, has been proven to be composed of sodic urate, calcic urate, free uric crystals, with some calcic phosphate and carbonate.''

The use of the word ''assumption'' in this connection seems particularly appropriate. To our mind, Dr. Peirce's whole theory is made of assumptions. The first is, that these deposits, which he calls hæmatogenic, *begin* at the apical extremity independent of any oral connection. The second is that *all* such deposits contain urate of soda, and indicate gout. The third is the confining the use of the term pyorrhea alevolaris, a term that has been generally used for so long a time, to this particular form of pericementitis. (I must protest against thus narrowing the use of this term.) The fourth is the attributing to these as yet unproven salts the primary rôle in the production of the disease. I quote his own words:

''The inflammatory stage of true pyorrhea alveolaris primarily begins in tissues on the side of the root near the apical extremity, and secondly advances toward the gingival borders. The cause of this inflammation, or pericementitis, is the plasma exudation from the blood-vessels, freighted with salts, which in their deposition and crystallization upon the cementum of the root exert the influence of foreign bodies, and so act as irritants.''

As against this last assumption I would place the statement of one of Dr. Peirce's chief supporters, Dr. Brubaker, where he says in a paper read at the same meeting as that of Dr. Peirce's, and published in the same journal (page 57):

''That the pericemental membrane, *the vitality of which has been lowered by mechanical or chemical agencies*, may become the seat of uratic deposits, is in harmony with pathological process occurring in other portions of the body.

''The mucous membrane of the bronchial tubes, *the vitality of which has been impaired by various causes*, may become the seat of uratic deposits, which will give rise to a persistent inflammation, attended by increased and altered secretion, and which resists the customary therapeutic means and yields only to an anti-gout treatment.'' (The italics are ours.)

That the various urates may be found in the deposits on the roots of teeth is not to be denied, but, as Dr. Rhein says, ''the tests presented are not sufficient to base a pathogeny upon, and it behooves us to corroborate his experiments before we come to the conclusion as to whether uric acid is found in some calculary deposits and not in others.'' Dr. E. C. Kirk has not met with the same uniform success as Dr. Peirce in determining the presence of uric acid in serumal calculus; and while I have not made any tests, I am prepared to say, from my general knowledge of the subject of gout, that time will prove the fallacy of the greater part of the assumptions made by Dr. Peirce.

But let us look at the subject still further. One of the most noticeable points in the discussion of this whole subject is the absolute ignoring of the most prominent pathognomonic symptom of gout,—viz, the neuralgia, and which is always present before any urates are deposited. Not a single writer has referred to this important symptom, upon the character of which most general physicians will diagnose an attack of gout without waiting for a chemical analysis of the urine or concretions.

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[*] The italics are ours.

The first definition of gout I learned from a small pocket lexicon, when a school-boy, was that it was "a painful disease"; later my academic copy told me it was "a painful inflammation of the joints"; still later my unabridged Webster told me that it was a "constitutional disease occurring in paroxysms," etc.; and further on my Encyclopædia Britannica said to me, "In all times this disease has engaged a large share of the attention of physicians, from its wide prevalence [we will refer to this again, but right here it may be well to remind the reader that this encyclopædia article was written in England], and from the amount of suffering it entails. Sydenham, the famous English physician of the seventeenth century, wrote an important thesis on the subject, and his description of the gouty paroxysm—all the more vivid for having himself been afflicted with the disease for thirty-four years—is still quoted by writers as the most graphic and exhaustive account of the symptomatology of gout." Regarding the suddenness of the attack and the character of the pain, this same authority says, "On the night of the attack the patient retires to rest apparently well, but about two or three o'clock in the morning is awakened with a painful feeling in the foot, most commonly in the ball of the great toe, but it may be in the instep or heel, or in the thumb. With the pain there often occurs a distinct shivering, followed by feverishness. The pain soon becomes of the most agonizing character. In the words of Sydenham, 'Now it is a violent stretching and tearing of the ligaments; now it is a growing pain, and now a pressure and lightening; so exquisite and lively meanwhile is the part affected, that it cannot bear the weight of the bedclothes nor the jar of a person walking in the room.'"

But it may be argued that these ideas of gout are obsolete, and that the more modern school of medicine recognizes as gout many forms or phases of gout,—a gouty diathesis, for instance. Let us see what some recent authorities have to say. In writing upon the subject in 1892, Page says,—

"The patient, usually a man of middle life or past, is wakened out of sleep shortly after midnight with pain in the metatarso-phalangeal joint or ball of the great toe, a part that is often the seat of injury from tight or ill-fitting boots or shoes; for, other things equal, gout first attacks the small joint that is the seat of the previous injury, etc. The pain and other symptoms subside during the day, but an exacerbation usually takes place toward night. . . . Chronic gout follows repeated attacks of the acute form. In this condition not only are the paroxysms more frequent and prolonged, but the articular structures become changed."

Some authors describe an irregular form that does not present the inflammatory symptoms, but this form is not generally recognized by the medical profession as true gout. Again, Strumpell, in 1892, treating of the subject says, "Gout is rarely seen in young persons. It is a disease of advanced life, rarely appearing previously to the fortieth year. Men are much more often attacked than are women. . . . The patient is awakened by a sudden and very violent pain in the metatarso-phalangeal joint of the great toe. The longer the disease lasts, the less typical are the separate attacks; there may now be less suffering at the time of an attack. . . . The gout gradually passes into its second chronic or atonic stage. *Occasionally* the disease is irregular and atypical from its incipiency; and the first manifestations may not be arthritic, but referable to the kidneys or other organs." (Italics ours.)

Whittaker (1893), after giving the general symptoms, says, "The pain increases, becomes excruciating; the patient feels as if the joints were penetrated with a hot iron, were twisted, crushed in a vise. The slightest agitation of the room or of the bed, the rumble in the streets, exaggerates it and irritates the patient beyond expression."

Regarding the irregularity or misplaced forms of gout, Dr. Flint cites "disorders of the stomach and intestines, consisting of neuralgias, also neuralgias affecting the fifth pair, the sciatic and other nerve-trunks"

Loomis also speaks under the same head of premonitory neuralgic symptoms, and Dr. J. M. Granville says "that although the nervous system is the prime mover in the production of the phenomena of gout, it doubtless is in the development of a great majority of functional and nutritive disorders the exciting if not the predisposing cause,—if the trouble is to be looked for at the periphery rather than at the center."

A careful survey of a large proportion of the literature extant upon the subject of gout, while treating of the subject in the fullest detail and fully recognizing the neuralgic aspect of the disease, fails to locate a single case in the oral cavity, where, if the disease is as common as Dr. Peirce would have us believe, it does not seem possible that such astute observers as I have quoted would have overlooked this particular manifestation, especially as such a location would give rise to an exquisite pericementitis and facial neuralgia, which would not be overlooked even by the most obtuse observer.

Regarding the gouty diathesis, I cannot do better than quote verbatim from an article by Henry H. Lyman ("Principles and Practice of Medicine," 1892, pp. 657–660):

"So numerous and so varied are the manifestations of gout, that it becomes impossible to furnish a brief and accurate definition that shall include all its varieties. It is always a chronic disease that persists during *the whole of life* when its origin is hereditary, and throughout the remainder of life when it has been acquired after birth. Its most conspicuous outbreaks are to be considered as exacerbations or exaggerations of a morbid process by which the nutrition of the organism is retarded and perverted. It belongs to that remarkable group of diseases which may be associated either in the same individual or among members of the same family who have derived their morbid predisposition from a common source. Among these disorders are included the allied mucous inflammations of the respiratory tract; also chronic acid dyspepsia, congestion of the liver, lithiasis, hemorrhoids, neuralgia, hemicrania, congestive headaches, acute, chronic, and muscular rheumatism, asthma, obesity, diabetes, and gout. These maladies all depend upon a peculiar retardation of nutrition that characterizes the arthritic diathesis.

"A broad distinction must be maintained between the *gouty* diathesis and the manifestations of *gout* itself. Diathesis is merely a convenient term by which is designated a predisposition that may be either inherited or acquired.

"During the early *infancy of children who have inherited the* arthritic diathesis, there is a marked tendency to the occurrence of eczema and of impetigo. In this respect there is a strong resemblance between scrofulous and arthritic subjects, probably on account of the fact that in both there is an analogous disturbance of the nutritive processes. *After the period of first dentition*, catarrhal inflammations of the respiratory tract are exceedingly common. As the age of puberty is approached, articular rheumatism sometimes occurs. Epistaxis is frequent, and headache is often experienced. If gonorrhea be contracted, it is exceedingly persistent and difficult of cure. Among gouty patients, simple catarrhal inflammations of the urethra, often accompanied by herpetic eruptions on the glans penis, are not uncommon. These inflammations often complicate the mucous membrane of the bladder and epididymis. *About the age of twenty-five years*, a peculiar eczema is frequently observed, symmetrically occupying the sides of the thumb, index and middle fingers ; this appears periodically every spring, and disappears during the warm weather of summer. Dry and scaly forms of eczema are frequently developed in the folds of the joints ; and among the obese they assume the appearance of intertrigo.

"*About the end of the third decade of life*, dyspepsia begins to torment the patient. There is flatulence, eructation, pyrosis, and constipation. The urine becomes highly charged with urates and uric acid. About this time pruritus and hemorrhoids invade the rectum and the anal region. The least exposure to chill now excites obstinate inflammations of the respiratory passages. Granular pharyngitis and suppurative tonsillitis are frequently observed, and the inflammatory process may extend through the Eustachian tube to the middle ear, producing chronic otitis with all its disagreeable consequences. Congestive headaches and hemicrania frequently alternate with each other. Boils often occur. The hair grows thin and falls from the scalp, and after a time the florid complexion gradually assumes an earthy discoloration as the liver becomes invaded by chronic functional disorders. Vertiginous attacks begin to develop, and gradually become more severe. Asthma, nephritic colic, and paroxysms of gastralgia now succeed one another as precursors of fully-developed gout. The brain suffers with the organs of the body. Irritability, impatience, loss of memory, reduction of the power of consecutive thought, and cerebral exhaustion add to the anxieties of the patient. *These vague and varied maladies often render life miserable for a considerable period of time before the final outbreak of the gouty paroxysm.* This usually occurs during the latter part of winter, when all the unfavorable influences that render life difficult in a severe northern climate occur to exhaust the individual. The patient retires to bed weary, chilly, and feverish. After a few hours of unquiet sleep, about two or three o'clock in the morning he is awakened by agonizing pain in the metatarso-phalangeal articulation of the great toe ; the joint appears swelled, red, shining, and hot. At the end of several hours of exquisite suffering, the pain subsides, and as morning approaches sleep becomes again possible. A day of comparative comfort is, however, succeeded by another night of agony, since the pain now returns at an early hour in the evening, and continues until the following morning.

"The *pulse* seldom rises above 100° F. Fever is continued for about five days, and gradually subsides. During the first two or three days there is severe frontal headache; sometimes the patient is delirious at night; during the day he is irritable and nervous; the tongue is thickly coated, and sometimes dry in its central portion and at the tip; there is thirst, loss of appetite, constipation; scanty, high-colored, and scalding urine, that throws down a copious sediment of uric acid and urates; during violent attacks a little albumin may appear in the urine, but it disappears as the fever subsides; the skin is dry at first, but about the fourth night it becomes moistened by a gentle perspiration that differs from the profuse, sour-smelling perspiration of acute articular rheumatism.

"During the *first attack of gout* the local manifestations are usually confined to a single one of the great toes; but during subsequent attacks both feet may be involved, and swelling appears in the joints of the tarsus, at the ankle, and in the knee. The joints of the upper extremity of the spinal column are rarely involved. Pain generally subsides after the third day; the swelling diminishes; redness disappears; the skin becomes wrinkled, and desquamation occurs. *Suppuration never takes place; but in chronic cases the joints become permanently enlarged by the persistence of œdema and by the deposit of urate of sodium.*

"During the height of the febrile movement fine crepitant râles are sometimes heard at the base of the lungs.

"The gouty paroxysm is efficient in the dislodgment and discharge from the tissues of an immense amount of *uric acid;* it is eliminated with the urine, and is present in the serum that exudes from blistered surfaces at a distance from the joints that are the seat of inflammation. If a blister be applied over such a joint, its serosity contains no uric acid. The increased oxidation that accompanies the fever serves to destroy and to expel uric acid and urates from the system. For this reason an acute attack of gout is usually followed by great improvement in the health of the patient, who often experiences for a time complete relief from the vague and sometimes obscure symptoms of which he had been previously tormented.

"An interesting example of this is related of the famous Lord Chatham (Lecky's 'History of England in the Eighteenth Century,' vol. iii, pp. 133–156). In old and ill-treated cases of gout, the paroxysms tend to recur more frequently; and finally the disease degenerates into chronic gout, in which there is no fever, and the joints remain permanently enlarged and œdematous. There is dull and continuous pain, which is never severe. Acute symptoms are entirely absent. Urate of sodium is abundantly deposited in the articular cartilages, and is accumulated in the circumjacent connective tissue, forming chalky concretions, known by the name of tophi. The joints gradually undergo disorganization, and the muscles, especially the extensors, become atrophied."

From the above it will be seen that tophi do not make their appearance until after the patient has suffered one or more acute attacks. See also Davis, pp. 302–3, "Predisposing and Exciting Causes."

Dr. Peirce wholly ignores the early catarrhal manifestations of the gouty diathesis and the paroxysmal stage, and jumps at once to the *tophus* deposits when the urates first make their appearance, and says, "In their deposition and crystallization upon the cementum of the root, they exert the influence of foreign bodies and react as irritants." And, again, "The excess of these salts general pathologists regard as indications of a faulty nutrition and *the immediate cause of a series of local disturbances.*" (The italics are ours.)

Let us now turn our attention to another aspect of the question not considered by other writers on this subject, and that is the frequency of gout and probable connection with serumal calculus; for Dr. Peirce has said that all such deposits are the result of gout or the gouty diathesis.

Dr. Davis, in his "Practice of Medicine," says, "Gout is not a disease that you will often meet with outside of the older cities of our country. It is not a common disease. During an active practice of more than thirty years in this city [Chicago] I have seen but very few cases of gout, except in persons who had a plain hereditary predisposition, or had brought the disease with them from some other community." Now pyorrhea alveolaris and catarrhal inflammations are very common in Chicago, and in fact throughout the entire Northwest, being the most common dental trouble dentists are called upon to treat in this state. More teeth are lost by its ravages than by decay, while, according to Dr. Davis, "gout is more prevalent in the temperate than in the tropical or more extreme cold climates. It is much more prevalent in the older cities of the eastern part of our country than in the western portion." Then, again, gout is largely an English disease, while pyorrhea alveolaris and catarrh are specially American diseases, and gout is of comparatively rare occurrence. Then, again, gout is a painful affection, while pyorrhea is a comparatively painless disease, almost never accompanied by neuralgia. And furthermore, gout is a disease of men, while pyorrhea is largely a disease of women, in this country. And finally, gout attacks persons after the middle of life, while pyorrhea is found in all ages. At the present writing there are no less than seven cases being treated in our college clinic, ranging from twelve to twenty years of age.

As to the comparative frequency of gout in connection with pyorrhea alveolaris, I would say that during an active practice and the most favorable opportunity of observation extending over fifteen years past, nearly ten of which have been spent in connection with large dispensary services, I have only seen two cases of pyorrhea alveolaris with gout as a complicating affection. One of these is under treatment at the present writing, having been sent to me by Dr. Little, of St. Paul, as a consultation case. A detailed statement of this case is appended.

Mrs. R., æt. forty, married, mother of four healthy children, all living, presented to Dr. Little about March 10, 1894, for treatment of a neuralgia of the fifth nerve of the left side, and involving the temporal region. Two small cavities in the second and third left inferior molars were discovered and filled with cement. The pain augmented, and resisted all local treatment. When I first saw the case, on Friday, in consultation, it was decided to remove the cement and substitute gutta-percha, as perhaps less irritating; also prescribed phenacetin to relieve pain. The patient returned the following Monday, having spent a most miserable interval. The teeth were then thoroughly cleaned, and large pockets were discovered around the molars of the left side, both inferior and superior, the process being largely absorbed. These were syringed out with H_2O_2 and then packed with sozoiodol and zinc. The patient was given a prescription of pyrozone and soda mint, for home use as a mouth-wash. She returned the latter part of the week still suffering, having had to resort to opiates in order to get any rest. Treatment repeated, but substituted a twenty per cent. trichloracetic acid for the sozoiodol, and renewed the home treatment of pyrozone. The patient returned the day but one following, and reported an aggravated condition, and showed marked evidence of the pain she had suffered. Still more careful examination was then made, and it being determined that the pulp of the palatal root of the left superior molar was dead, although the body of the pulp and the buccal roots were both alive, it was decided to extract this tooth, it being the least valuable and the most affected. The palatal root was almost entirely denuded, and had a small cavity at its cervical border, the one that had been filled previously. The process was also absorbed away from the buccal roots, and pus discharged from the alveoli freely. Its removal gave little or no relief, and the patient returned after a few days, still suffering exquisite pain. The local treatment, however, overcame the flow of pus to a considerable extent, and the mouth was found to be in fairly good condition ; but the neuralgia was still unbearable without morphin and chloral hydrate. The patient was closely questioned as to previous condition of health, and the following history was elicited : Had seldom been ill, although had some rheumatism ; three years before had had what she supposed was an acute attack in the left ankle that was very painful, so that she had to take opiates, then as now ; but it disappeared in a week or ten days, and she had been comparatively well until this attack ; was a good liver ; liked rare beef, and ate freely of it, and used fruit also. Upon being questioned as to whether she had had any neuralgia anywhere else this time, said that it seemed to go to the left shoulder-joint. The diagnosis seemed clear enough to suggest a paroxysm of gout, and I accordingly so advised her physician, Dr. Senkler, of St. Paul, and asked him to place her on a vigorous anti-gout treatment, which he did with good results.* The patient, at the present writing, July 1, is free from all neuralgic trouble connected with the teeth, but still suffers from pain in both shoulder-joints. Dr. Senkler says, "Put the case down as one of rheumatoid gout."

The other case referred to occurred in private practice some eleven years ago, and was somewhat similar, responding to local and constitutional treatment combined. The case was also handled in consultation with the family physician.

In concluding this paper, let us sum up the main points :

I. Gout is a painful neuralgic affection, usually located in the joints.

II. Pyorrhea alveolaris is not necessarily a painful disease, although neuralgia may be present in exceptional cases.

III. Gout is confined to middle and later life, while pyorrhea alveolaris generally begins before thirty.

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* The treatment of this case will be detailed in a succeeding paper.—Ed.

IV. Gout is essentially a disease of men, while pyorrhea alveolaris affects both sexes indiscriminately, showing a preference, if any, for the female sex.

V. Pyorrhea alveolaris is very common in America, where catarrhal affections are also most common, while gout is of unfrequent occurrence.

VI. Gout is very common in England, but pyorrhea is much less frequent there than in America.

VII. Pyorrhea alveolaris is most common in the Northwest, where catarrhal affections are admittedly more frequent than in the East, and gout less so.

VIII. Constitutional treatment of gout in cases where pyorrhea alveolaris is found complicating the condition mitigates but does not cure the local condition. The tophi of gout never produced a drop of pus in the world, which is the principal diagnosticating feature of pyorrhea alveolaris ; therefore uncomplicated gout cannot be classed as the cause of the suppurative stage of the disease.

IX. Pyorrhea alveolaris, as the disease is generally recognized, is the suppurative stage of a catarrhal affection of the gums and peridental membrane, due to local infection from the saliva.

X. And, finally, pyorrhea alveolaris is a catarrhal affection of the oral cavity, which, in many instances, depends upon a general catarrhal dyscrasia for its ability to engraft itself upon the tissues. These complicating constitutional conditions, among others, may include gout or a gouty diathesis.

THE USE OF PEROXID OF SODIUM AS RECOMMENDED BY DR. E. C. KIRK.

BY WILLIAM J. TURNER, M.D., D.D.S., BROOKLYN, N. Y.

(Read before the Dental Society of the State of New York, May 9, 1894.)

THE peroxid of sodium was presented to the notice of the dental profession by Dr. E. C. Kirk, of Philadelphia, in a paper read before the Second District Dental Society, State of New York, at its meeting held in Brooklyn, February 13, 1893.

It is the usual custom for dentists—and all probably agree that it is a wise one—to be rather conservative in taking up the use of new remedies until they have been thoroughly tested in practice by some one, especially when their use narrows the field of application of others we have long depended upon, and with which we have obtained good results. We must see the need of a change before accepting the new. However, dentistry has probably been the most progressive of all the professions since it has become established, and unless one has his eyes continually open and is always on the alert to see what is going on about him, although he may think that his practice is successful and his methods and work as good as he has a right to expect, he may suddenly awake to the realization that others are leaving him behind and accomplishing what he has not thought of attempting.

The peroxid of sodium has been introduced to us as both a bleacher of discolored tooth-structure and as an antiseptic and disinfectant.

As its field of usefulness as an antiseptic and disinfectant is very much greater than that as a bleacher, it will be principally as such that we will refer to it. For more than a year now it has been with us, and believing it, as we do, to be one of the most valuable aids in our practice that has ever come to our notice, and knowing that very many have never taken advantage of its application, this effort has been put forth to again call the attention of those present and of those to whom the proceedings of this society will become known to the great value of this agent.

Ever since the practice of dentistry had its beginning, the treatment of teeth having dead pulps has contained an element of uncertainty, and to this day no one in any such case can absolutely predict the result. In his ordinary work on teeth having living pulps, a dentist feels that he is practicing a nearly exact science ; he is pretty sure of what he will accomplish ; but the moment he has to deal with a tooth having a dead pulp, he knows he cannot surely foretell the outcome of his labor. As witnesses of our shortcomings in such cases, we have continually coming before us teeth that become sore at the inception of any systemic disturbance, and many that are retained in the mouth only because a fistulous opening through the gum allows a vent for the discharge that otherwise would cause pain, swelling, and probably an acute abscess. If we attained perfection, none of these teeth would remain in this unhealthy and unhealthful condition. Every antiseptic and disinfectant ever used by us in pulp-chambers and canals has been for the purpose of lessening the chance of such disturbances, and although great progress has been made, all realize that much more is to be desired, and the peroxid of sodium has been introduced as in advance of other agents previously used. Here, then, we have a remedy advocated to supply a recognized need, and by a man who is a thorough chemist, and a most patient, conscientious, and skillful investigator,—Dr. Kirk. These facts make the peroxid of sodium well worthy our consideration and trial.

The chemical reaction that takes place when the peroxid of sodium is introduced into a pulp-canal has been so clearly and fully set forth by Dr. Kirk in the paper above referred to, that it will be unnecessary to go into that here ; suffice it briefly to say that, like the peroxid of hydrogen, it is an active oxidizer from the facility with which it parts with one atom of oxygen, and that in addition it is a saponifier and solvent of oils, fats, and of the pulp-tissue.

Dr. Kirk claims for it great penetrability,—even that its action extends far into the dentinal tubuli, where it produces its characteristic effects on the fibrils. That this is so is proven by its great bleaching properties. It saponifies and dissolves them, and the oxygen evolved aids in their expulsion.

We all know that in the treatment of teeth having dead pulps, what we have to fear is the incomplete removal of the pulp-tissue. If it has been recently devitalized, adhesions between it and the walls of the canal may be so strong as to prevent all coming away in mass ; and in tearing it out piecemeal, parts may be left. Again, if longer dead, it may be so softened as not to possess sufficient cohesion to be removed entire, and a like result occurs. Then there are those many canals that we all meet that are so small or curved as to defy our best endeavors to penetrate. The decomposition that may follow is always the primary cause of what trouble may occur. This decomposition or putrefaction cannot take place without the presence of micro-organisms, and, on the contrary, these micro-organisms can do no harm if not in their proper environment. The dead pulp furnishes a proper medium for their growth and development, and if brought together under favorable circumstances the process of putrefaction goes on, exposing the patient to the dangers that may accompany it. If all the pulp were removed, leaving the micro-organisms shut up in the canals, they would quickly perish, just as an animal of a higher organization would if deprived of food. Dr. Miller has shown that the tubuli of the dentine are so small and contain so little nourishment for germs that they must soon die if they find their way there. Be that as it may, a tooth is of a porous structure and absorbent, as the difference between a specimen out of the mouth and one in will show. If absorbent, it will become permeated with any liquid substance that may be in the canal for a sufficient time. When a pulp dies and decomposes in a tooth, therefore, we have an infected state not only of the canal, but of the substance of the dentine itself. Experiments quite elaborate have been conducted by Miller to show that none of these products, liquid or gaseous, will penetrate outward to the pericementum and give trouble. But when dealing with a front tooth we must consider this infected dentine because of its discoloration ; and with a back tooth, the same principle that impels us to discourage on the part of a patient the idea that any kind of a filling-material is all right as long as it does not show, will also necessitate our doing more than to guard against future pain. It will make us seek to render the parts engaging our attention as perfect in all their details of structure as we can.

When we consider the great vitality of the germs with which we are dealing, and what is needed for their destruction, we may well despair of ever rendering a tooth which has become infected absolutely sterile. For instance, we have been taught by those who have experimented scientifically that the only way in which an instrument may be entirely disinfected in the reasonable time of a few minutes is by immersion in boiling water. If, then, this much is required for a smooth, polished surface of metal, how much more for complicated tooth-structure, and where the mass of the tooth is so great compared with that of the agent employed, as is necessarily the case in the mouth ! Our only resource, therefore, is in what we before alluded to,—as complete as possible removal of that which allows the development of the germs,—the pulp-tissue. For this the peroxid of sodium is especially helpful. Where our finest instruments will not go, there will it penetrate and exert its action. This was so well expressed by Dr. R. Ottolengui in the discussion of Dr. Kirk's paper when presented, that it has seemed well to use his words. He said, "I want to refer to a paper we had from Dr. Blackstone (see DENTAL COSMOS, March, 1893), advising us to leave in the pulps any organic matter that we could not get out. In the discussion that followed, I suggested that in the future discussion of pulp-canals of teeth we should divide them into two classes, those accessible and those not accessible, and then turn our attention to those we could not get at. Let us admit that none of us get access to certain canals, and then find some way of treating them. I had not the least idea, two or three months ago, that the treatment of those inaccessible canals would be so quickly solved, for it seems to me that in talking about the bleaching properties of this agent we are overlooking a very much more important usefulness which will come out of this paper to-night. Here we have been shown an agent that will go into every one of the tubuli, destroying and dissolving the organic matter there contained, and also throw it out ; and if that is true, we have an agent for the complete sterilization of those fine canals in the distorted and narrow roots of molars which we cannot penetrate. They are as much larger than the tubuli as they are smaller than the other canals. Here we have exactly the method we are looking for,—a method of treating those inaccessible pulps medicinally by dissolving and ejecting their contents, at any rate sterilizing them ; and it seems to me it is one of the most important points brought before us, for it gives us a chance to do away with abscesses, and also to attack those cases where decomposition has gone further and attacked the tubuli.''

Allow me to present a brief history of a case in which a good result was attributed to the use of the peroxid of sodium. A young lady came to me last October to see if anything could be done to save three of her front teeth,—the right central and both laterals. She told me that during the previous winter a dentist, while preparing the pulp-canals for filling, had drilled through the side of the root about half-way up to the apex in all three of them. She was displeased with the treatment, and went to another dentist, with whom she had fifteen sittings of only about five minutes at a time, long enough for him to change the cotton and renew his medicament in the root. During all this time the teeth would immediately become so sore upon any attempt to stop up the canals tightly that it was necessary to have the dressing applied loosely. As there was no improvement in the teeth, she allowed them to take their course, nothing being done to them while she went away for the summer. In October, when I saw her first, the teeth were found to be much discolored, quite sore, and loose, and from the canals there was a discharge of pus which she said was always present. The cavities which had been made in the palatal surface were found very much enlarged, so that when the débris which had long been collecting, and the carious matter, had been removed, very little of the crowns was left except the enamel, the teeth now presenting a pretty good color. The decay also extended down the walls of the canals, making them very large down to the opening at the side. After many trials and spending much time, it was found impossible to penetrate the canals beyond the false passage, they probably being very small, or the original accident would not have occurred. Here, then, was a case in which, from what has been said, we would expect benefit from the peroxid of sodium, owing to its action on the contents of the upper ends of the canals, where an instrument would not go. The teeth were treated one at a time in the same manner, and followed a like course. The rubber-dam having been applied and the cavity and canal cleaned with instruments as much as possible, a saturated solution of the peroxid of sodium was introduced, allowed to remain a few minutes, and washed out with warm water, repeating this several times. Then a fifty per cent. aqueous solution of zinc chlorid was placed in the canal, and the whole temporarily covered over with gutta-percha.

This was removed in a week, the tooth meanwhile being greatly improved, and the same treatment repeated, after which the canal and cavity were filled with the zinc oxychlorid and the surface covered with oxyphosphate, first pressing a pellet of soft gold down into the canal to occlude the opening in the side of the root made by the drill. The teeth now are almost as firm as their neighbors, they are useful, not objectionable in color, and the young lady is much pleased with the result.

THE FIRST PERMANENT MOLAR.

BY DR. R. M. SANGER, EAST ORANGE, N. J.

(Read before the Dental Society of the State of New York, May 9, 1894.)

THE first permanent molar is the link that connects the temporary with the permanent set of teeth, and it is due to this fact, more than to any idiopathic conditions, that this tooth is more often lost than any other.

Primarily the fault is with the parent, who thinks that the second teeth first appear when the child begins "shedding teeth." Until a tooth is lost, it is usually thought that all the teeth in the mouth are temporary in character and will be replaced. The yawning caverns in the first permanent molars are uncared for, because they are "only baby teeth, and will come out anyway,"—a prophecy which comes true because of the ignorance which made it.

But secondarily it is the fault of the dentist that these teeth are so considered, and so lost. The one stigma against our profession today is that we do not practice preventive therapeutics, but are satisfied to repair the ravages of disease, and accept a fee therefor. The physician is constantly and studiously seeking for some means of preventing and exterminating the diseases of mankind, while we at most seek for the etiology of a disease, and having settled upon some fixed theory in regard thereto we consider that all is accomplished. We know how the disease is caused, and we know how to deal with it when presented to our notice, and so we await its coming and then treat—and charge for the service.

But in relation to the first permanent molar, more than any other, it should be our duty to so manage, at least with those families in our practice over whom we have complete control, that a large cavity, with the sequence of death of the pulp and abscess, should rarely, if ever, occur. And there is an aspect of this subject which I have not seen discussed, which I will now ask you to consider.

It is a well-known fact that caries is a disease more of youth than of maturity. If an individual at the age of forty presents a set of teeth in which forty fillings have been placed, it would be a safe estimate to judge that thirty of these had been inserted prior to the age of twenty. The cause of this is dual. There is little doubt that where normally good health exists throughout the life of the individual, the teeth are constantly becoming more and more dense in structure, and therefore more resistant to the ravages of decay. Per contra, it follows that the younger tooth is more liable to be destroyed. From this it results that during the earlier years there will be more decay present in a given mouth at a stated time, supposing the teeth to be unfilled, than at a later period. This leads us to the consideration of the second and more important cause. It has been shown, and freely admitted, that caries is a disease of bacterial origin. It must therefore be an infectious and contagious disease. I fear that dentists do not give this sufficient consideration. In the first place, how seldom are the temporary teeth filled! The second molars most frequently, the first molars occasionally, and the anterior teeth scarcely ever. Thus when the first permanent molar is approaching, not only is it in the very condition which renders it most liable to carious attack, both because of its internal structure and its position in the mouth, its deep sulci overlapped with gum-tissue as it slowly emerges, but it actually pushes its crown forth into an area reeking with contagion. It is small wonder that decay rapidly ensues. Then, by the ignorance of the parent and the consequent neglect, small cavities in the sulci grow to monstrous proportions, so that by the time the incisors are in place we have four large garden pots in which myriads of bacteria are thriving. Yet we are astonished and cry, "What a shame!" when at the age of ten or twelve we are compelled to extract these teeth, which have now come to be abscessed, and at the same time we must place approximal fillings in the incisors.

But, gentlemen, whose is the fault? It is with ourselves. We are not tradesmen, who barter and sell, with the single object of personal gain. We are professional men, and the first boast of a profession should be self-abnegation and consideration of the welfare of our neighbors. If there is disease in the world, ours is the duty to alleviate it, to eradicate it, to prevent it, and so stamp it out of existence. If there is ignorance which causes that disease to thrive and flourish, what is more simple than to so educate those who place themselves in our charge that because of the more intelligent attitude of the patients the disease itself may be aborted?

The first step, then, in the care of the first permanent molar is to see the child at or before its eruption. The parents must be taught that the approaching teeth are intended by nature to last a lifetime; that they do not belong to the temporary set, even though no teeth have been lost antecedently; and above all things that they need close scrutiny to preserve them. With the parents thoroughly educated to the importance of the situation, the dentist becomes responsible.

Before all things, all decay must be eradicated from the mouth, even though this necessitates the extraction of some of the temporary teeth. No possible derangement of the regularity of the second set is sufficiently proportionate to the danger which the first permanent molar encounters in the presence of rotten milk-teeth, to excuse the retention of roots and remains of teeth which cannot be filled. The simple rule then is, in regard to the molars of the temporary set, that they must be filled or extracted. If abscessed, extraction is advisable, even though filling be possible. As to the anterior teeth, many of these may be filled, especially the cuspids; but where filling does not seem advisable, at least the decay should be removed, and the cavities treated with nitrate of silver or made as smooth and flat as possible. But for the sake of the advancing permanent teeth, the mouth should be rendered absolutely free from all pollution.

If this be thoroughly accomplished, the battle is half won, and the first permanent molar will have a new lease of life.

If the mouth is seen at that period when the molars are but half erupted, something can be accomplished by an examination to discover whether or not the sulci are deep, as they probably will be found to be. If so, a bit of spunk pressed tightly under the overhanging gum will in a few minutes elevate the soft tissues, and dry the parts sufficiently to permit the smearing of the coronal surface with oxyphosphate. This, if the mouth be kept dry with a napkin for a few minutes, will adhere sufficiently well, especially deep down in the sulci, to serve as a protection during the period of eruption, a time fraught with much danger to the tooth.

Where the teeth are already erupted when seen, possibly at the seventh year, then all the sulci should be probed, and the slightest cavity is an indication that a filling is needed. What shall that filling be?

Where I cut out the sulci myself because decay has but just been started, I fill with gold, if other conditions, such as the temperament of the child and the sensitiveness of the salivary glands, do not contraindicate. In the lower molars the sulci are cut from end to end in both lines of the cross, even though the cavity proper is a tiny pit at one end, and a single filling is made to occupy all of the vulnerable territory decayed or liable to decay. In the upper teeth, usually two fillings are needed in each tooth, the one in the posterior sulcus extending into the palatal groove very frequently. It will not commonly be found difficult to use the dam over the lower teeth, so that there will be no excuse for shirking a thorough filling; but in the upper jaw it will often be a serious matter to accomplish this. If it can be, it should be done; but if not, a perfect filling of gold may be made, using the napkin to keep the moisture away. The cavities may be superficially large, but they are rarely deep, and by working rapidly, with the aid of a saliva-ejector, the desired result may be attained. Crystal gold is very useful in these places.

Later on, perhaps at the tenth year, the cavities may be much larger, if indeed they were not very large at the seventh year. If the four teeth are found all with deep cavities, nearly approaching the pulps, and probably very sensitive, leathery decay lining the walls, special treatment is necessary. At the first sitting as much decay should be removed as can be done with safety to the pulp and without too much pain to the child. But at this early age it should be remembered that the pulps are very large, and therefore easily exposed if the decay be ruthlessly scraped away. It is better to be very cautious, and, having gone as far as safety permits, a good germicide should be sealed within the cavity for at least a week. The mere mopping out of a cavity with cotton saturated with an oil or an acid will not accomplish what is needed, which is the sterilization of the decay that is to be left in place for a time. The essential need is to obtain a deep penetration of the decayed dentine by the medicament, so that the bacterial germs, the agents of decay, may be eradicated by extermination. Ordinarily, with adult teeth, all carious matter should be removed, as the only absolute method of aborting decay; but in these young teeth, where the decayed dentine is of that particular kind which we call leathery, it is perfectly justifiable to leave a considerable layer at the bottom of the cavity. Nay, when we consider the troublous sequences of pulp-death, we see that it is absolutely demanded that the effort at conservation should be made. The argument against this procedure is that if we could remove this stratum of leather-like material, and examine it microscopically, we would see that it harbors colonies of bacteria too innumerable to count. That these may continue to exist and exert destructive influences, even though covered by a filling which, tightly placed, excludes light and imprisons them in microscopic confinement, is well known. Therefore it follows that only as dead germs will it be safe to tolerate their presence near a pulp. Professor Miller's experiments as to the penetrating powers of various germicides conclusively proved that at least twenty-four hours is necessary for the best to pass through carious dentine to even a slight depth; it is therefore evident that I am safe in advising that the germicide shall be sealed within the cavity for at least a week. By that time we have a right to hope that the decayed dentine has been rendered innocuous, and may be left in contact with the healthy dentine to which it is adjacent without danger. Before filling this cavity, it will be as well to coat the walls with one of the balsam preparations now offered, my own choice being a solution of white rosin, and then covering the floor of the cavity with a thin disk of asbestos saturated with the gum preparation, to prevent irritation of the pulp by the acid of the cement, and from thermal changes.

In choosing how to fill, several methods are open to us. To use a filling of oxyphosphate alone is not bad practice if the child will be continuously under observation, so that renewals may be made as required; but perhaps it will be preferable to use oxyphosphate mixed with the alloy of one of our amalgam preparations. I prefer mixing the alloy shavings with the powder of the cement, and then using just as I would the cement alone. In a short time after insertion the oxyphosphate washes out slightly, but by attrition the exposed ends of the fillings coming to the surface are ground down, until finally the whole filling presents with a metallic surface, which prevents further disintegration.

Another method is to half fill the cavity with oxyphosphate cement, allowing all the walls to be smeared, and then before it sets amalgam may be inserted. This makes a good permanent filling, easily inserted, and will preserve the tooth certainly for several years. Then, when renewal with gold is indicated, the whole may be removed, and the decay which was left in will be found hard and dry. If desired, it may be scraped out, for by this time the retiring pulp will have protected itself by proliferating a new layer of dentine between itself and the enemy.

It not infrequently occurs that the first permanent molars are brought to us with fully one-half of the crowns lost by decay, so that they present without a vestige of the original coronal contour remaining, appearing merely as badly decayed roots. Yet when we come to examine we find that the pulps are still living, and the typical leathery decay is all that protects them from the outer world. Not even in this condition should these teeth be relegated to the forceps. I would rather, even under these deplorable circumstances, make the effort at salvation which I have so often seen crowned with success. The procedure is thus: Take a careful impression with plaster, and upon the model, having the occlusion indicated by a bite, construct a band which is so wide that it would not permit the closure of the mouth. Then carefully crimp in the edges of the band until the occlusion is accommodated. In this manner a sort of skeleton crown is produced, the top being open. This is carried over the remains of the tooth in the mouth, and at once the case is made to resemble the previously described condition. We may now seal in the germicide, covering it with a temporary stopping, and a week later, when the cement is inserted, the coronal band is securely fastened, the dam or napkin having been placed so that dryness is assured, and the upper part is to be filled with amalgam. This, unlike the last, is to be counted a permanent operation. The question might be asked, Why not simply crown the tooth at once? The answer is that a regular crown does not permit of the medication, and is necessarily more expensive, while no more permanent than the open band filled with amalgam. However, a crown may sometimes be preferable where time and the means of the patient permit.

In other mouths we occasionally find that the teeth prior to the visit to us have received dental attention which has taken the form of frequent and large amalgam fillings, which have in due time become leaky, so that new decay has supervened and the pulps have become exposed, a veritable toothache being the force which has moved the patient to seek our aid. What is to be done in this deplorable and too common condition? Much will depend upon the presence or absence of the second molar. If these latter teeth are in place,—that is to say, if the patient be fifteen years old or thereabout,—an effort must be made to save the teeth. The pulps are to be devitalized, and the teeth treated in accordance with the conditions presenting. A case from practice is to the point.

A miss of sixteen presented with the pulps exposed in both superior first permanent molars. In both, several amalgam fillings were present. In one, the frail buccal wall had broken down until the buccal edge of the cavity was far below the free margin of the gum ; in the other the condition was similar, except that it was the palatal wall that had been lost. The amalgam fillings were removed, and all decay taken away. The pulps were devitalized, and fortunately it was possible to remove them from all roots, and to fill the same with unusual satisfaction. Meanwhile, dressings of cotton packed tightly against the gum and covered with temporary stopping had sufficiently exposed the upper margins of the cavities so that amalgam could be used as a filling-material and properly polished after setting. These fillings were not made to restore contour, but were rather pyramidal. Finally the teeth were completely covered with gold crowns. This was done because it was plain that the structure of the teeth was such that even during the life of the pulps they could not resist destructive agents. Therefore after losing this source of vitality it was manifestly wise to fully protect them from the bacteria of the mouth by covering them with crowns. The slanting sides of the amalgam filling permitted the telescoping action of the crown, so that even the uppermost edges of the cavity could be reached and covered by the edges of the crowns, leaving no point of amalgam left open to attack below the gum-margin.

But suppose that such a condition, requiring the removal of the pulps, were to present at the age of nine or ten? Then we should carefully consider the advisability of extraction. It would be a conservative decision which would lead the operator to attempt the thorough removal of the pulps first; and if he accomplished this to his entire satisfaction, it might be safe to continue the procedure and fill the teeth. But failing to thoroughly remove the pulps and fill the roots, it would seem justifiable to extract the teeth at once, relying upon the second and third molars to fully equip the patient with masticatory apparatus.

From which it follows that, if the first permanent molars become abscessed before the appearance of the second, extraction is the most scientific procedure.

CROWN- AND BRIDGE-WORK. A PROTEST AGAINST SOME OF ITS ABUSES.

BY S. H. GUILFORD, D.D.S., PH.D., PHILADELPHIA, PA.

(Read before the Dental Society of the State of New York, May 9, 1894.)

Truly we are living in a wonderful age. Scientific achievement and development are progressing at so rapid a rate that it is difficult to keep pace with them, and we are often led to wonder what new marvels the coming century may have in store for us.

Dentistry, in common with other departments of art and science, is feeling the quickening and making rapid advancement all along her lines.

In none of her departments, however, has progress been more noticeable than in that branch of prosthesis known as crown- and bridge-work. The method, in its simplest and rudest form, is very ancient, and its amplification and improvement up to a dozen years ago had not been such as to excite special comment; but within the last decade its developmental strides have been so great and its field of usefulness so largely extended as to surprise even those who were its warmest advocates.

Fulfilling requirements that had not been met by any method that preceded it, in that it often afforded a satisfactory means of artificial replacement without the objectionable accompaniment of a plate, it has come to stay, and will henceforth be regarded as one of the accepted procedures in dental prosthesis.

Unfortunately, however, like many other innovations, the method has suffered from abuse, so that its promised blessing has almost been converted into a curse.

Practiced at first by men who, recognizing its inherent advantages, brought to its development skill, good judgment, and honesty of purpose, it had no sooner found favor with the public than it was seized upon by a horde of unskillful and unscrupulous practitioners who used it, or rather abused it, by making it minister to their avarice alone.

It is indeed lamentable that this most valuable method of replacement, with possibilities for greatly benefiting mankind in general, should have been found capable of such abuse as to bring discredit upon the profession where only benefit had been expected and deserved.

Crown- and bridge-work is inherently a combination of mechanical and surgical procedures, and requires for its proper performance the best treatment in both of these lines.

It is through lack of appreciation of this fact that failure has often followed honest endeavor, whilst absolute disregard of it on the part of the charlatan has too often been the means of inflicting positive injury.

In simple crown-work the object is to restore to usefulness broken-down crowns and roots of teeth ; and whether it is to be accomplished by encasing the remains of the crown, or mounting upon its root a hollow metal shell, as in the case of posterior teeth, or similarly restoring the anterior ones with porcelain or combined porcelain and metal crowns, the surgical features of the case demand that the crown or root to be operated upon shall be reasonably firm in its socket, that it be free from either present or prospective pathological conditions, and that the investing membrane be not injured by the operation. The mechanical and esthetical features to be considered are, that the proposed artificial crown shall be harmonious in appearance with the remaining teeth, that it be of the same size and form as that of the lost crown, that its adaptation to the root be as perfect as possible, that its retention be secured by a medium of the greatest durability, and that if any portion of the crown or its adjuncts extend below the free margin of the gum, they shall not impinge upon or irritate the pericemental membrane. A crown constructed and mounted in conformity with these requirements approaches the ideal in this class of work, and yet how seldom do we find this ideal realized !

To-day, throughout the length and breadth of this land, and in other countries as well, thousands of crowns are being placed that do not conform to one-half of these requirements.

Inharmonious in their surroundings, poorly constructed, ill-shaped and ill-fitting, receptacles at their borders for all that is vile and unclean, their only claim to tolerance being that they for a time keep their places and in some measure assist in mastication, they confront us continually, not only in our offices, but in the streets and public conveyances, filling us with mortification over the prostitution of a noble method to base ends.

In bridge-work the same requirements hold as in crown-work, but they are supplemented by others, owing to the more extensive character of the work and the increased difficulties attending it.

Bridge-work should be simply extended crown-work, and such it is when properly employed ; but when carried beyond its proper limits, or when it is attempted in cases where it is contra-indicated, a multitude of evils result.

The adjustment of two crowns to roots favorably situated to serve as piers or abutments involves no more difficulties than the mounting of a single crown upon a single root, whilst the construction and attachment of the intervening crowns or dummies demand principally mechanical skill and esthetic taste ; but what may be a simple and proper procedure in a favorable case becomes a very complex and doubtful one where too much is attempted.

Blinded by the success that attended the earlier efforts of conscientious practitioners in this line of work, too many of the rank and file of the profession, overestimating its possibilities, eagerly adopted it as a panacea for all the ills of plate-failure, and a ready means of increasing their practices and incomes. Failing to realize its limitations of usefulness, it has been employed in promiscuous instead of special cases, with the most disastrous results. In many cases, roots that were loose and had lost the support of their investments through disease have been used as piers for bridges; sound teeth have been ground and mutilated out of all resemblance to their former selves for the same purpose; pulps have been ruthlessly sacrificed and sound crowns excised in order that foundations might be secured for a proposed bridge; and, worse than all, and more inexcusable, two sound and valuable teeth have often been hopelessly disfigured and injured in order that they might be used to support between them a single artificial crown.

In other cases, diseased crowns and roots have been covered without previous treatment or disinfection; the sides of roots have been perforated by the drill in enlarging their canals to accommodate the dowels; remains of crowns and margins of roots have not been trimmed to proper shape, so that the ferrules or shells, when placed upon them, stood out at their edges, a constant source of irritation to the surrounding soft tissues, favoring the deposit of *débris* and inviting the decay that is sure to follow; a few teeth and roots have been made to serve as a support for a full complement of crowns, and pieces of greater or less extent have been so rudely constructed and placed under unfavorable conditions that the wearers have only been relieved of their discomfort by the removal of the structure.

Has so great an array of charges ever before been brought against an inherently reputable method in dental practice?

We very much doubt whether the combined abuses of amalgam, vulcanite, and arsenic have equaled those of crown- and bridge-work.

Wherein lies the remedy for all these evils? The harm that has already been done cannot be undone. The fair fame of dentistry has been tarnished, and only time and improved methods of practice can restore to her the position she has temporarily lost.

Many evils are self-limiting; in time they remedy themselves. Such, we fondly hope, will prove to be the case in the present instance. Indeed, the more observant have already noticed the turning of the tide.

Failures, like curses, "come home to roost." Many have arrived, and legions more are on the way. We know of no better teacher than experience, and many of those who embraced the new method at its most promising period with all the ardor of a first love, are now beginning to realize that discretion is a safer guide than enthusiasm.

If we rightly discern the signs of the times, the immediate future will witness the insertion of fewer bridges, and those that are inserted will be constructed and placed more in accordance with surgical, mechanical, and esthetical principles.

The practice of mounting a large number of crowns upon a few roots or teeth will have to be abandoned as physiologically wrong and at variance with true mechanical principles. Although in a limited number of cases nature has been tolerant of such abuse, in the great majority discomfort, failure, and mortification have been the only results. So, too, the plan of securing artificial crowns or bridges in place by building them into cavities in the adjoining teeth, although not generally practiced, will have to be discarded on account of its unscientific character and the certainty of ultimate failure. The extensive grinding and cutting of sound teeth on their four vertical surfaces to receive a telescoping crown as a bridge-support will also have to give way to some better and more comfortable method of treatment.

Such mutilation cannot be right, and, more than all, it would seem to be unnecessary.

It has been indulged in under the generally accepted belief that a metal encasement must cover the entire crown in order to protect it from future attacks of caries ; and while this liability would be present if the shell extended nearly to the gum-line, it would be greatly lessened if the line of termination of the gold crown were about the middle of the tooth, where its diameter is greatest. A half-length shell can be readily and accurately fitted without tooth-dressing, and according to the writer's experience answers all requirements perfectly.

Another serious matter associated with present-day bridge-work is the difficulty of repair. Between the chances of the fire and the excessive strain in mastication, porcelain facings will break away, and must be restored. Many ingenious plans have been devised for making these restorations in place, but all of them are unsatisfactory. To properly repair a bridge, it must be removed, and this in a fixed bridge involves an inordinate amount of time, trouble, and annoyance. If no other reason existed for the partial or total abandonment of fixed bridges than that of difficulty of repair, it would be self-sufficient.

In considering the shortcomings of past practice, we must remember that the method is still in its infancy, with many of its possibilities as yet undiscovered, and that the impossible of to-day is the accomplished of to-morrow.

We have no doubt that the fertility of resource and invention inherent in members of our profession will soon remedy all defects of the past, and eventually bring out of this system a higher and more rational method of practice than has obtained in the past.

Two significant facts tend to confirm this belief. One is the increasing favor with which movable bridges are beginning to be regarded, on account of their obviating many of the difficulties and disadvantages associated with the employment of fixed or permanent bridges, and the other is the growing tendency to combine the better features of crown- or bridge-work with the best forms of ordinary plate-work. The former may be said to have led the way to the latter, for they differ not so much in kind as in degree. No careful reader of periodical dental literature can have failed to notice the transition gradually taking place, and in it we see the most hopeful signs for the future of dental art. Indeed, had the introduction of crown- and bridge-work done no more than teach us the importance of saving an apparently unserviceable crown or root and utilizing it for the anchorage of a partial denture, we would still be under immense obligations to it. It has done far more than this, however, and not the least of its benefactions has been the obliteration of the evils attributed to the employment of clasps ; for, instead of being taxed, as formerly, with the difficulty of attaching a much-needed clasp to an ill-shapen or unfavorably inclined tooth, we now have the means of so changing its form by crowning as to be of the greatest possible service to us.

What the future developments of crown- and bridge-work may be we cannot foretell, but its possibilities are so great that many surprises doubtless still await us.

If we would derive from the method its greatest possible benefits, we must devote our best efforts to its proper and healthy development. It has been said that only an artisan of the first class is capable of properly constructing this style of work ; but we would go further, and declare that no one is fit to undertake it who does not have a correct understanding of the fundamental principles, both physiological and mechanical, that underlie it. Students in our offices and colleges should have impressed upon them the delicate character of the work, and the necessity for thoroughness and accuracy in its construction ; they should be taught the minute anatomy of the organs and their surroundings, and shown how readily a physiological condition may be converted into a pathological one ; and, perhaps more than all else, they should be made to comprehend the present limitations of the method and its possibilities for good or evil according as it is judiciously or injudiciously employed.

By thus properly instructing those who are just entering our ranks, we may hope soon to bring about a better state of affairs that will enable us to render to those who need it a professional service of the highest order and productive of the greatest good.

FUSING GOLD FILLINGS IN ARTIFICIAL TEETH.

BY NAAMAN H. KEYSER, D.D.S., GERMANTOWN, PA.

To satisfactorily prepare a cavity in an artificial tooth, and insert therein a gold filling that shall have the desired artistic effect without unduly weakening the tooth, is not an easy task. It is impossible in many cases to form the cavity in the exact spot that best meets artistic requirements. The margins of the cavity are frequently so shaped—unavoidably so on account of the nature of the material and the tools necessary for use upon it—that the edges of the finished filling present an uneven outline ; this, and the difficulty of securing reliable retention, and the liability to accident in preparing the cavity and while inserting the filling, has led to the attempt to imitate gold fillings by some process such as those used for fire-gilding upon porcelain and glass.

A type of these is the method of Thomas S. Phillips, of Buffalo, New York, for producing imitation fillings for artificial teeth, the subject of United States letters-patent No. 325,626, granted September 1, 1885. Mr. Phillips uses the gold prepared for the use of china painters, placing it upon the tooth in the desired position, and in a suitable furnace, fusing it upon or into the porcelain, repeating the operation a sufficient number of times to give the gold the desired body. This method, judging by the specimens that I have seen done by others and the results of my own experiments, is not satisfactory. If the gold is thinly applied, the filling lacks artistic finish. If sufficient is added to overcome this, not only do the edges present an uneven outline, but during polishing, or afterward in the ordinary course of wear, owing to the extreme attenuation necessary to properly blend them with the surface of the tooth, they are apt to roughen and curl up ; this ends in their speedy destruction, the gold, *en masse*, peeling off.

These difficulties I think I have overcome by the following method : I first form in the tooth, in the desired position, by means of a suitably shaped diamond point, a shallow cavity of the desired shape. (I here refer to the improved diamond points recently advertised in the DENTAL COSMOS, a copper tool charged with diamond dust. Nos. 1, 6, and 8 I have found particularly useful for this purpose.) It is not necessary that this cavity should be at all deep. The main object of the depression is to secure thick and strong edges for the filling. I should say that the one-thirty-second of an inch would be amply sufficient. It is desirable that the edges should be sharp, even, well defined, and smoothly finished. The cavity should not have beveled edges ; its walls should be as nearly as possible at right angles to the surface of the tooth. This is essential to a neat, artistic operation. A cavity of this kind can be readily formed in positions where it would be difficult to make one of sufficient depth to receive a gold filling inserted in the usual manner.

The cavity thus formed I line with Downie's enamel, mixed with water to a thin, creamy consistency, working it well to the edges. This enamel fuses at a low heat. I have used it simply because it happened to be handy. I presume that any of the recently introduced glass or porcelain filling-materials, fusing at a low heat, would answer as well. While this is still moist, I place in the cavity a block of the S. S. White crystal mat gold, previously moistened with water, so that it may absorb and sink into the enamel. Sufficient gold should in like manner be added to fill the cavity, and to slightly lap over the edges, lightly pressing it into place. The tooth is now placed in a Downie or other like furnace, and gradually the heat is applied and increased until the enamel is thoroughly fused. This can be accomplished without fusing the gold ; it is essential, indeed, that the texture of the gold should not be impaired by too high a temperature. It is now allowed to slowly cool. The enamel takes firm hold upon the spongy surface of the crystal gold, uniting it strongly to the porcelain tooth. If the filling is a small one, it is now finished by condensing the gold with flat-surfaced instruments, burnishing, and polishing with sand-paper disks, felt wheels, etc., in the same way that an ordinary gold filling would be polished. If the filling is large, it is better, before condensing, to pack onto the surface of the gold sufficient of crystal gold or foil (I prefer foil) to give the filling the desired contour.

Repeated trial of this method has given very satisfactory results. Attempts to make an imitation filling by using a piece of pure gold plate in place of the crystal gold has not, in my hands, proven satisfactory, the gold readily peeling off. Possibly corrugated foil, or rolled gold, cut into narrow strips, might be used in the same way as the crystal gold ; the latter, however, does so well that there seems but little room for improvement.

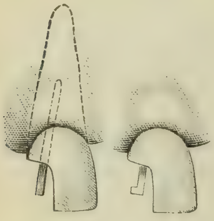
RESTORATION OF A CORNER WITH PORCELAIN.

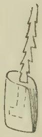
BY DR. WILLIAM C. SPEAKMAN, WILMINGTON, DEL.

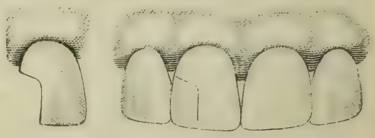
EVERY practitioner is well acquainted with the distressing condition often presented to him, that of superior incisors where caries has progressed so far as to require a restoration of a fourth or a third of the tooth ; where it seems hardly justifiable to crown, and yet to restore with foil means a long and tiresome operation, and often nervous patients refuse to submit to it. The latter method, again, is objectionable at times ; for instance, teeth that are much shown in conversation, or in the mouths of public speakers, singers, etc.

Such a case came under my care some time ago, and the missing portion supplied in all porcelain with such gratifying results that I am tempted to describe it, thinking some one may have an occasion to try it. I have no doubt that this is old to a great many. I do not claim originality ; in fact, it was suggested to me by the description given in Evans's treatise on crown- and bridge-work (second edition, p. 138).

My difficulty in following this description has always been in obtaining a tooth which could be nicely ground to fit, especially if the case be that of a narrow tooth. Another difficulty has been to allow for a slight changing of shade after metal was soldered behind and above the porcelain, also the joint presenting a non-pleasing aspect. The case in hand was completed as follows. The pulp which was exposed was devitalized, removed, and the canal slightly enlarged ; the walls of the cavity shaped with corundum points, and sand-paper disks, smooth, and the margins at right angles to the outer surface of the tooth.







A pin of stout wood was made to fit the canal, and a trifle longer. A thin piece of tin foil was burnished over the walls, the wooden pin sticking through this. Oxyphosphate was then mixed rather stiff, pushed upon the end of the pin and against the tin foil, which keeps it from sticking to the tooth, allowing its ready removal together with the pin, after its being trimmed to the proper contour with chisels and sand-paper disks. Any plastic material no doubt will do, but the oxyphosphate suggested itself to me as being hard, not likely to change its shape, and holding the pin firmly.

An iridio-platinum pin was made at the same sitting to fit the canal, making a small right-angle end for additional strength to the tip.

This with the oxyphosphate model was sent to a dental manufacturing company, who duplicated it in porcelain exactly the color of the natural tooth, with the iridio-platinum pin baked in place.

A very little trimming sufficed to make a good joint, which can be done with the small corundum points. If the rubber-dam be applied it will greatly facilitate this, as well as insuring perfect dryness while setting the piece, which was done with oxyphosphate, the pin being roughened. The result was very pleasing indeed. It has been in place quite a time, and is doing good service.

PROCEEDINGS OF DENTAL SOCIETIES.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

(Concluded from page 555.)

At the afternoon session Dr. B. C. Nash read the

REPORT OF THE COMMITTEE ON PRACTICE.

The papers secured for this meeting by your committee who have had the matter in charge, show a recognition on their part of subjects that will be likely to prove most attractive. There is one topic, however, which they do not seem to have provided for,—viz, that of "Tin Fillings,"—and I have grouped together some of the published matter for your consideration.

At the World's Columbian Dental Congress, in the section on operative dentistry, Dr. H. L. Ambler, of Cleveland, Ohio, presented a paper on "Tin Foil for Filling Teeth," which started what may be regarded as a plethora of this subject; but if, as has been claimed, it is entitled to the highest position in the rank of tooth-saving materials, the earnest advocacy of its partisans will be gratefully received. Dr. Ambler, and others who have both preceded and followed him, ascribe to this material saving properties superior to any other material, and it is now claimed to possess capabilities of manipulation that heretofore it has been believed cohesive gold alone possessed, allowing of any desired contour. This material is recommended above all others for filling young and soft, or poorly calcified teeth. Dr. S. B. Palmer is quoted as attributing to it the property of not only arresting decay mechanically, but that in frail, chalky structure it acts as an anti-acid element in arresting the electric current between tooth and filling. Dr. E. T. Darby advances a method which, while not wholly new, as Dr. Bonwill claims to have used it many years before, yet is novel to the profession,—that of melting chemically-pure block-tin and molding it into the form of a wheel, from which, after mounting it upon a lathe, shavings are turned off which are used in their freshly-cut state for filling. Greater cohesion is claimed for this form than the preparations of foil, and Dr. S. G. Perry, after having used it, indorses it highly. Dr. C. E. Francis then came out with even a stronger recommendation of tin foil, stating that if pure and properly prepared and used, it is no less cohesive than the shavings. He presented some beautiful specimens of contoured fillings done in teeth out of the mouth. The cohesive characteristics as compared with gold were somewhat doubted, which stimulated Dr. Francis to prepare an additional article, the most recent contribution, I believe, to this subject. It contains a compilation from the standard dictionaries as to the meaning of the term "cohesive," and also a number of letters from various dental practitioners, chemists, etc., as to their understanding of its meaning as applied to the subject in hand, corroborating his expressed views. Whatever may be the correct definition or definitions of cohesion, it has had for dentists until now but one special meaning, and that as applied to gold for tooth-filling,—the property by which particles or layers of this metal could be united without force so as to be inseparable. Tin was not supposed to possess this characteristic to any extent. Dr. W. C. Barrett, in an article on "Tin-Foil Fillings" published in the *Dental Practitioner and Advertiser* for July, and reprinted in Catching's Compendium for 1893, describes the method of its manipulation which probably represents the idea that the majority of its users had of it. He writes as follows: "The average gold worker, when he attempts to use tin foil, seeks to employ the same kind of manipulation with it that he does with gold foil. But the characters of the two metals are widely at variance. Gold can be made to cohere. One particle can be added to another and actually welded to it. This is not the case with tin. It does not weld, and the most that can be done in consolidating it is to so intermingle the surfaces of two pieces that they seem practically to be one. A pellet of thin gold foil can be laid upon a bar of the same metal, and by the impact of a smooth instrument united to it. Not so with tin. Under like circumstances, it would be found necessary to use a sharp-pointed instrument, and by a succession of indentations to drive the particles of one piece into the other. Hence the impact of a mallet is out of place in consolidating tin. It is impossible to add pellet to pellet, and by hammering with a mallet to build up a filling as with gold. The best way to insert tin is to use it in the form of cylinders, following the instructions laid down by the early operators for using soft gold. In the early days dentists were unacquainted with the welding properties of gold foil, and depended upon wedging it in. This is precisely the manipulation proper for tin foil, which has the qualities gold was formerly thought to possess. . . . The mallet should not be used, because under its blows the tin is literally chopped out. But two kinds of pluggers are needed,—wedge-shaped ones for inserting and pressing to place the cylinders, and round or square condensers for consolidating the surface."

Dr. Gordon White, of Nashville, Tenn.; Dr. Stockton, of Newark, N. J.; Dr. St. George Elliott, of London, England; Professor James Truman, of Philadelphia, Pa., are enthusiastic in their encomiums of tin used separately or in combination with gold. Opinions differ as to what proportion of the two metals should be used. Dr. White prefers to use them separately. Dr. Stockton filled two teeth twenty-three years ago, placing gold at the labial margins of the cavities and completing with tin. These fillings, he says, are perfect to-day. Dr. Elliott says that if the correct proportions be used (which, however, he does not give) there is practically a chemical union between the two metals, resulting in hardness and some expansion. This hardness is not immediate, but takes from one to three years. Professor James Truman says it is a most valuable combination, and is better when placed in wet cavities than dry, owing to the action of the oral fluids producing galvanic action between the two metals and producing hardness.

Dr. A. W. Freeman, of Chicago, fills approximal cavities three-fourths full of tin or tin and gold, completing with cohesive gold. He uses more tin than gold, wrapping the tin inside.

Dr. R. C. Brewster has no faith in the saving properties of tin alone or in combination, after twenty-five years' conscientious use of it.

Dr. W. G. A. Bonwill says tin will preserve tooth-structure on any surface protected from attrition; but that a contour will not hold. That it is from no peculiar electric quality, but on account of its softness and pliability that allows of a perfect fit, thus destroying capillary action and preventing subsequent decay.

Dr. Genese says that teeth will not always stand the enormous pressure required to pack tin foil, and he doubts if it will preserve cervical borders as has been claimed.

Dr. S. C. G. Watkins states that if a smaller amount of tin than of gold be used in combination, the result is almost sure to be a failure, as the tin will dissolve out; but if the tin predominate, the combination becomes very hard, and is a preservative filling.

Dr. E. A. Bogue says a filling having but a thin foundation of exposed tin with a large proportion of gold on top may always be expected to fail. When tin preserves teeth, he believes it is because the fillings are well put in, and not on account of any magic qualities in the material employed. He would confine its use to buccal cavities, flat surfaces, and grinding-surfaces.

Dr. Benj. Lord, in a reprinted article on "Combination Fillings," Catching's Compendium, 1893, says, "I am satisfied that until recently I employed more tin than was well. I now use from one-tenth to one-twelfth as much tin as gold, and no disintegration ever occurs." He obtains his proportions by the width of the two strips of tin and gold, laying the tin inside and folding the gold over and over. The two metals should be thoroughly incorporated by manipulation, and after a time they will be more or less amalgamated. By using about one-sixteenth of tin, the color of the gold is so neutralized that the filling is less conspicuous than when of all gold, and can be used on the labial surfaces of front teeth.

By way of comment, let me say, in closing, that the advocacy of tin as a tooth-saver by the older practitioners is doubtless the result of personal observation and experience in its use. What surprises me is the fact that so few fillings of this material ever present in the mouths of the patients who come to the younger practitioners. In a practice of about twelve years I have seen a small percentage of tin and gold fillings having the amalgamated appearance described; but I do not remember to have observed any tin fillings except a few which I myself inserted. With this I leave the matter for your consideration.

Discussion.

Dr. W. C. Barrett. The report embodies a remark which I made some time ago, which I now wish to entirely repudiate. I have learned something since that time, and I feel that, although I am not much older, I am very much wiser in regard to the use of tin. The tin which I used before that time was not of a proper character. I must recede from the ground I took then. I attended a meeting of the Second District Society in Brooklyn, and at that meeting Professor

Darby read a paper on the merits of tin, and presented some specimens which were different from anything I had seen before. I prepared some when I went home, and I find that as for its cohesiveness gold is not in it, to use a colloquial expression. If tin becomes exposed to the air for any length of time, it becomes oxidized, which utterly destroys its cohesive properties. The shavings are not good after thirty days, although I have kept them closely corked in a bottle. At the end of thirty days, they do not respond to the same kind of manipulation as before. I obtained some foil that the professor had prepared, and I found that was as cohesive as the shavings. I have found tin quite as cohesive as gold. Contour can be restored as readily as with gold. I do not mean to say it will have the strength that gold will have, nor do I mean to state that it is as practicable to use tin as gold for the restoration of contour. It will not last as long, of course. I believe I stated at that meeting, and further reflection simply confirms in my own mind the impression that I then expressed, that if we could have but one material for filling teeth,—if everything else were blotted out of existence, everything that could by any possibility be used for the filling of teeth, and only one thing could be retained,—I believe more teeth could be saved with tin than with any other material. I do not mean by that that tin is adapted to all kinds of fillings. It is not properly adapted to the restoration of contour ; but I believe a greater proportion of teeth can be saved with tin than with any other single material. It has been too much neglected in the past. Its merits have not been sufficiently considered, and we should experiment more with it. It requires skill of a high order to use tin, and it is more laborious ; besides, the results are very little better than amalgam. So the average operator, when he gets fifty cents for a filling of tin or amalgam, will use amalgam, because it is more easily inserted ; but it will not save teeth as well as tin.

Dr. C. F. Wheeler. I have annealed tin at a low temperature many times, and it has been as cohesive as gold.

Dr. S. B. Palmer. It has been said that too little tin or too much tin would cause a failure. There is a law that governs that also. If we take the gold and tin foil, lay it one upon the other, and then cut it into strips, roll it into cylinders, or cut it into blocks, but always in equal proportions, the gold and tin will unite to perhaps the extent of about two leaves. It should not be thick. I took a piece of gold, and laid tin foil upon it, and vulcanized it ; I took it apart, and there was the tin attached to the gold, and it took a tin polish. It had transferred itself, and would have lasted without any deterioration. You could build up as high a stack as you please. The mutual attraction or interchange of the atoms from one to the other is to that extent. Some speak of failures in building cavities of tin and gold. If you make a stick of it in that way, and put it into water, or produce a filling in that way, it will very soon become a solid mass of metal, representing the color of amalgam, and make a very durable filling. It is really electrolysis. If you put in more gold, it will not do any harm. I have seen fillings put in by Dr. Abbot, in Berlin, in that way. There were rough indentations. There was more tin than could be cared for by the gold. The work was done for Miss Nash, a sister of Dr. Nash, and I suppose it is there yet. I use tin under a gold filling for a guard filling. About one or two leaves of it will be hard on the bottom or top of the filling (whichever it may be), and the rest of it is washed out or remains there in a black mass. You call that a failure, then. Now again, if you fill that two-thirds full and cap it off with gold, there is no galvanic action between the two. The union of the two is perfect,—and then backing up that by any mass of tin, is the same as uniting an amalgam with gold. If you use any mass of tin, use enough, so it will not be dissolved out. Never use a small quantity alone, but use gold foil, and it will take care of itself.

Dr. Chaim. I think Dr. Nash's point was well taken as to the fillings that present themselves to dentists in practice. I have had opportunities to see tin fillings which were put in by other men. I rarely attend dental meetings but that I hear tin foil discussed for fillings. At the same time, the tin fillings that have come under my notice have been remarkably few. When these cases come into my hands, the tin fillings are usually somewhere else, and the patient is with me. I never could see the practicability of a tin filling. It would be an interesting point if the members were called upon to say how many tin fillings have come into their hands, placed there by men other than themselves.

Dr. Canaday. For ten years I have made considerable use of tin and gold, and have employed it after the fashion that Dr. Palmer has described. If, in addition to what he has said, the members will use for the final condensation of the filling the Herbst burnisher, they will obtain very satisfactory results.

Dr. Tompkins, of Utica. I have within the last two or three months seen quite a number of tin fillings which were placed there fifteen years ago by my father.

Dr. Geran. I have a filling in my mouth put in by a very inferior workman forty-two years ago, and this filling is doing good service to-day.

Dr. Jarvie. I do not want to let this subject pass without saying a word about it. I have used tin foil ever since I commenced to practice. There is a class of teeth in which I prefer tin foil to anything else,—that is, the cavities on the grinding-surfaces of children's teeth up to twelve years, sometimes fourteen. I rarely fill a cavity with gold in the tooth of a child under twelve years of age, that I want to keep permanently. These tin fillings last from three to ten years, and they do not give out on account of decay, but on account of the tin being worn away sufficiently to require renewal. At that time, you will find the little tin that may be left in the cavity, or the bone underneath the tin, hard and firm. I think a dentist who does not use tin foil does not always do the best for his patient. The tin foil that we ordinarily get I could not use. It is too thick, it is too hard, and requires altogether too much pressure for my purpose. I use a tin foil that is about No. 3,—a little finer than No. 4. Such foil you can use almost as readily as a plastic material in the fissures of those teeth. It is put in place with comparatively slight pressure. I put it in place with a foot instrument,—a plugger,—and then I use a burnisher, depending largely on the burnisher for the result. I am not speaking now of very large cavities, although I use them in such cases. I refer principally, however, to the fissures. In regard to the cohesive quality of tin foil, I never saw that property until the meeting when

Dr. Darby came to Brooklyn. He put a block of tin on the lathe, and shaved it off as thin as the foil would be. That tin was very soft, and as cohesive as gold. It was much softer than cohesive gold. I have not found that cohesive property in tin foil, although I have tried. I am now speaking of the cohesion as we have been accustomed to find it. I can make the tin foil cohere by using an instrument with coarse serrations, and forcing one layer or particle of foil into the one that is already in place. In that way you can produce a contour filling with tin foil. I do not think the result would pay for the labor expended. I found I could accomplish the same result with foil that I had in my office for ten years, as I could with fresh foil that was brought to me by Mr. Kearsing. I did not consider that cohesive, however, as we generally understand that term. I could force the particles into one another with coarse serrations. I consider tin foil a very valuable material for the class of teeth in which I use it.

Dr. Holmes. I have had experience since 1848. I consider tin foil, properly manipulated, for approximal cavities in children's teeth and soft teeth, the best material for the preservation of those teeth ; but it requires quite as much care and time and patience as it does to operate with soft gold foil. Those fillings should be put in reaching from down deep in the cavity, and extending out sufficiently beyond the cavity to admit of being cut off, so there will be no lapping. Take a buccal cavity filled in the same way, where your cylinder stands in the cavity and projects out, or in the crown of a tooth where it extends from the crown out,—you must be sure that the ends cannot lap and pull out afterward,—and you will be surprised how long that will wear. Use a needle-shaped instrument for that. The final finish should be a wedged piece of tin that you can drive in. With the engine and the corundum disks that we have, it can be trimmed off very nicely. It will save soft teeth better than anything I have ever tried.

Dr. Canaday. I can show fillings in the surface of molars that were placed there ten years ago, and to-day they are doing good service.

Dr. S. B. Palmer. I think I ought to do something to show the value of tin to those who have not used it. When a cavity is prepared for an amalgam filling, place over it one or two thicknesses of tin foil, and with a burnisher press it down somewhat, and then introduce the amalgam into that pocket or depression, and then fill the tooth as you ordinarily do. It amalgamates immediately, and you would not know in the work that you had introduced anything, and there is no excess of mercury. There is no amalgam filling introduced into any tooth in my work, unless it is lined with a resinous substance. Very few amalgams go into the dentine and make a solid mass, unless they contain considerable copper. In every filling that is made of filings or shavings, there are portions of that plug that are not thoroughly amalgamated. If that were so, your filling would be altogether too soft. Those particles continue taking up a certain amount of mercury, until they have absorbed all they can, and then the filling is considered done. The result is that on the back of the filling, between it and the dentine, galvanic action dissolves out the mercury, and leaves the portions there which give you that roughness. Your filling sometimes shrinks, and that is one of the greatest causes of amalgam-shrinkage. When you put the tin there, that acts precisely the same as when you amalgamate a piece of zinc in the battery. There is an action going on the same as there is between the two parts in your amalgam filling. When you place your tin there, you have against the dentine the same properties, or nearly the same, as if you were filling with tin.

Dr. Greene. I think the one great objection to using tin is that people do not have the proper idea of working it. For instance, a great many will use it by laying one layer on another. They should make the tin in cylinders, and in filling let the first cylinder project, put in the next one, and so on, with all the ends projecting ; then with a wedge drive the last piece in, trim it off, and you will find it is already condensed. I have practiced filling approximal cavities, by using the matrix. In the first two or three layers put in one layer on another of the tin, and then proceed in the same way until you have the tin in the same shape as at the top. It is the same as setting a book up endwise in the cavity.

Dr. Nash. I must say that I have not used the tin shavings so as to form any idea of the cohesive properties from my personal experience. I have no doubt that it can be done in that way. The strongest point that has been brought out by Dr. Francis is the fact that the tin foil is often more cohesive than the tin shavings. We have in recent years had several kinds that seemed to be popular. We ought to hear all sides of this question, and see whether anything new has been brought out. While I was in Dr. Dwinelle's office, from 1876 to 1880, I never saw him insert a tin filling. He was an old-school practitioner, and what surprises me is that he should have abandoned the use of a material which possesses so many good qualities as tin does. I do not think there is anything else that I can add. It has been even better discussed than I expected it would be.

Dr. William J. Turner, of Brooklyn, read a paper entitled "The Use of Peroxid of Sodium as Recommended by Dr. E. C. Kirk," which is printed in full on page 597 of the current number.

Discussion.

Dr. Ottolengui. The essayist has done me the compliment to quote something which I said when this subject was first brought up. It was really in the nature of a prophecy, because at that time we did not know what could be done with it, the agent being introduced to us as a bleaching agent; but from what Dr. Kirk said that night, I thought it would be very useful to us in the way the essayist of to-day has mentioned. I have had nothing but the most favorable results from the use of the remedy. I have had cases that gave a great deal of trouble, because after the removal of decay, and the apparently thorough cleansing of the canal, a dressing which was sealed up would result in pain. The patient would return in twenty-four hours reporting pain. It has been exactly in those cases that I have had the best results with the peroxid of sodium. I want to speak of something which I have not yet seen in print. If this agent acts as a saponifier, it seems to me important to get all this out from the tubuli, and I do not think the rinsing out with warm water is sufficient. Wrapping a fine broach with a few fibers of cotton, I have been surprised to see how much I could get out of a canal that I considered was thoroughly dried out. Four or five times I have drawn out the cotton with some foreign matter on it, before the cotton could be withdrawn perfectly clean. In using it, you will get a better result by using the cotton to wipe it out. It is very rarely that I have used the material more than three times; twice has been sufficient in most cases.

Dr. Van Woert. I felt that it was due to Dr. Turner and the other gentlemen from Brooklyn that I should say something on this subject. The last time I spoke about it was at the union meeting of the First and Second District Societies. There I made the statement that it was necessary to take from three to eight days in making the solution,—that is, to get a thoroughly saturated solution, and one that would keep a reasonable time. Dr. Kirk at that time could not understand the necessity for that. My purpose in speaking to-day is to cite a case to substantiate my statement, and to show that Dr. Kirk feels now about it as I did at that time. So many have tried this and failed, that I think this explanation is due the profession.

Dr. Gage, of New York, wrote to me at the suggestion of Dr. Kirk, some months ago, to ask how I made the solution. I replied in as detailed a manner as possible, and I got a letter from him saying that he failed entirely. I was not satisfied, and thought perhaps he missed some of the little points, and I sent him some of my preparation. I received a letter from him that the results were immediate and satisfactory. I forwarded this to Dr. Kirk, and he wrote me that he wanted the matter for publication in the Cosmos.* I want to give you that plan in detail. I do not mean, by taking from three to eight days in making the solution, that it is necessary for you to stand over that bath and at regular intervals add so much of the peroxid; but I mean if you are in the vicinity of the bath that you can add to it gradually. It should never be put in in the lump condition that it comes in in the can. If you drop it in in that condition, you will notice a great agitation on the surface. It will have a dark color, resembling iodin. If the peroxid is put into the water in that way, I have never yet been able to make a solution that would do the work. If it is powdered, and a very small quantity dropped into the water, about what you would take on the point of an ordinary penknife, not oftener than once in a half-hour, you will get a solution in a couple of days; but if it is inconvenient for you to go to the laboratory as often as once in a half-hour, it may take you six to eight or ten days. That is the solution that so far has been successful with me, and with many gentlemen in New York and Brooklyn. I felt that that ought to be thoroughly understood. If it is not properly mixed you will fail as sure as fate, and the peroxid will get the blame.

I have been asked how it is possible to tell that you are getting a saturated solution. You will notice that when the last particles are dropped in, the whole solution will take on a milky appearance, as though you had dropped a little milk into it. It will not stand many additions after that. I would not put in more than one portion of the powder after that.

Dr. Nash. What would be the result?

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* See Dental Cosmos for June, 1894, page 499.—Ed.

Dr. Van Woert. I do not know what the chemical result would be; but it spoils the solution. It is used more particularly in the treatment of dead teeth than in any other way. I am using it with the most satisfactory results.

Dr. Evans. At what temperature do you keep that solution?

Dr. Van Woert. I have a peculiar bottle that I keep it in. In making it, I take an ordinary tumbler, half filled with water, and place it into an ordinary-sized pudding-dish containing ice-water. I keep it in a cool place.

Dr. Osmun. In the treatment of pulpless teeth, I have been using peroxid of sodium, and I have had successful results. I have used it substantially as Dr. Van Woert has mentioned. I wash out the tooth with a three per cent. solution of pyrozone. I then use the peroxid of sodium as often as the case demands, and then I use that old reliable agent, carbolic acid, and I seal it up with gutta-percha, and I have had some wonderful results.

Dr. F. A. Greene. When you have made the solution in the tumbler, how often do you renew it?

Dr. Van Woert. I have some in my office that I had three months ago, and it is just as good as ever. I think Dr. Ottolengui can testify to that.

Dr. Turner (closing the discussion). It is a good plan to be careful not to get the solution on the gum. Although it does no permanent injury, it gives a great deal of pain. Dr. Hill, of Brooklyn, who has used the agent extensively, was speaking of one case where he treated a tooth with a fistulous opening. He pumped the solution through the apex until it appeared on the gum on the outside, and got very good results from it. Shortly afterward, I had a case of that kind. I wanted to use the remedy, and thought it would do no harm if I allowed it to touch the gum. The patient came back, and said she had suffered a great deal of pain. The gum did not look badly, and has not troubled her since; but it is well to avoid producing such an effect.

At the evening session Dr. R. M. Sanger, of East Orange, N. J., read a paper entitled "The First Permanent Molar," which will be found at page 601 of the current number.

Discussion.

Dr. Carr. What is the proper germicide to use, which the essayist stated he left in the tooth for one week?

Dr. Sanger. Carbolic acid.

Dr. Barrett. This is an old and a hackneyed subject. I have always heard that the first permanent molars are the most important teeth to be preserved. We all know that the mouths of the great duct of Steno, which supply saliva to the mouth, are opposite the first molars. They are in the center of the arch, and in the course of mastication, by the force of the movement of the jaws, we have constantly on the glands the pumping action of the masseter muscle. It forces a stream of saliva into the mouth opposite these teeth. If these teeth be removed prematurely or unnecessarily, then we have the function of insalivation very materially interfered with, and consequently digestion is impaired. Yet these teeth must sometimes be lost. I have never felt the necessity for sealing up in a tooth such an antiseptic as carbolic acid, which penetrates so readily, for germicidal purposes. It is not the strongest of germicides. If I were to use a germicide, I should not use carbolic acid. I might use it as an antiseptic, according to the circumstances of the case. The disinfection of the decalcified dentine over the pulp, of which the essayist spoke, is of course an important matter; but I should hardly concede that it was necessary for carbolic acid to be sealed up there for any length of time. A filling could be inserted which would hermetically seal it up, and there will be no fear of germicidal action. When the germs are cut off from the action of the air, there is no danger. These teeth should, of course, be saved if possible; but sometimes their structure is so imperfect and so loose that it is impossible to do so. Under such circumstances I have removed the first molars. It has been urged also that they should be removed in nearly all cases. I never removed one yet because it was the first molar. I should not be in favor of the preservation of these teeth by means of crowns at an early age. I do not believe in the attempt to fill the roots of the first permanent molars before they have reached their full maturity and their full growth. You get too much deterioration of the tissues about them when you attempt to fill the roots of the teeth before the foramen is entirely closed. Those are the criticisms which I would make upon the paper. Certainly there is very much to commend in it.

Dr. Sanger. What would you do with the roots that were not thoroughly closed?

Dr. Barrett. I do not mean that the foramina of the roots should be entirely closed; I mean until the contour of the roots should have been entirely completed, and the calcification of the teeth shall have proceeded sufficiently far so that the root-canal shall not be too large, and the foramen undeveloped.

Dr. Sanger. I said if it occurred before the second permanent molar appeared I should extract.

Dr. Barrett. I did not understand you to say that. I agree with you that the tooth should be extracted in that event.

Dr. Low. The other day I had occasion to treat a case where one of the superior first permanent molars could be filled, and an attempt was made also to fill its mate on the opposite side. The temporary filling had to be taken out, and the roots were treated. The child is about thirteen. The second permanent molar was erupted. The roots of the tooth were filled. Although the arch of the pulp-chamber was not broken through, I could see a pink cast there that indicated that it was very thin. After filling the roots of the tooth, I placed a capping of tin foil and filled above that with cement. The next day the patient returned reporting severe pain, and the filling was taken out of the pulp-chamber. The root-canal fillings were all left, and the teeth assumed at least a comfortable condition. That tooth is in that condition to-day. What to do with it I do not know. How to undertake to preserve that tooth I cannot tell. I would like the essayist, or some other gentleman, to give me some advice. If I extract the tooth, it will interfere with the articulation very seriously, and I dislike very much to resort to extraction.

Dr. Barrett. It is impossible to prescribe any course of treatment in a case where the data are so insufficient. We should have to see the case.

Dr. Low. The canals are so well filled that the tooth is comfortable; but the pulp-chamber seems to be so much decayed, and the dentine and cementum above the pulp-chamber and below the bifurcation of the roots so thin, that it is like a fissure. I attribute the pain that occurred after the introduction of the pulp-chamber filling to the close proximity of my filling to the peridental membrane. I have removed it, and all pain has subsided. The roots are filled with gutta-percha cones.

Dr. Jackson. Since this question is to attract our attention for a little while longer, I would state that a bit of gutta-percha, dipped first into oil of cajuput and then into iodoform, would be the most soothing thing that could be put there. Some gentlemen ask me why I use iodoform. Take a case where the cavity extends under the gum, and use iodoform, leaving it there for a week, and you will find that there is no decomposition or special irritation of the gum. Press in the cotton, even though you have used carbolic acid, and it will be very irritating; but iodoform is very soothing, and I think gives better results in such cases than any other medicament that I have used. I find that the method I suggested is very good. Soften the gutta-percha, moisten it with cajuput while it is still warm, dip into iodoform powder and press it over the part while it is still soft, and it will give good results,—that is, where the gum overlaps the cavity.

Dr. Barrett. I do not see the benefit of using both the iodoform and the cajuput.

Dr. Jackson. This is merely a supposititious case. It will not irritate the tissues. I cited the case to show that with the use of iodoform there would not be any special irritation. In placing a pledget of cotton in a labial or approximal cavity, if you dip the gutta-percha into water, then into the iodoform, press it into the cavity, force the gum out of the cavity, and leave it there for a week, you will find there is no special decomposition, showing that the iodoform had preserved the cotton against the absorption of the saliva, which would act as an irritant. It has the same effect in covering the slight opening where the peridental membrane had become exposed between the roots in the pulp-chamber.

Dr. Starr. Will Dr. Low state how long after he made the root-fillings he put the filling in the pulp-canal, and how soon the pain ceased after that?

Dr. Low. I made the root-filling and put in the pulp-chamber filling at the same sitting; but the roots had been treated, I think, twice, because of the fear of the open foramen, and because there was some exudation from the roots on probes wound with cotton. The pain ceased immediately upon the removal of the pulp-chamber filling. There was one layer of tin foil above the cement. There were gutta-percha fillings in the three roots To protect it from the cohesive influence of the cement, I used one layer of tin foil.

Dr. Rhein. Do you suppose it is possible that those roots were separated and split, and you did not know it?

Dr. Low. I do not think they were; but of course they may have been. It was a very delicate case, and I could not go into the dentine any farther.

Dr. Rhein. If the roots were separated, that might account for it.

Dr. Jarvie. The suggestion I would make is that the fillings in the root are not tight, and that is where the trouble is. I do not think that a filling such as was put in the pulp-chamber would produce irritation sufficient to give any trouble whatever, and the fact that the pain ceased when it was removed would indicate to me that the fillings had not been tight. I think that is the solution of this trouble, and not the material with which the pulp-chamber was filled.

Dr. Low. I have some peculiar notions about antisepsis of roots. I believe that we scarcely ever make the root of a tooth perfectly antiseptic with the use of any antiseptic remedy. I made some experiments in the roots of teeth out of the mouth, expecting to prove quite a theory. I always found out of the mouth that some germs would form. I believe, and of course act on that belief in my treatment of roots, that as long as we can make the roots so there is no appearance of moisture on a fine broach, and in adult teeth where the foramen is closed—whether it be the second or third sitting—we are perfectly safe. I use gutta-percha cones, with a slight solution of chloro-percha on the tips. In this case, I am sure that they were tight. They appeared to be tight after the pulp-chamber filling was taken out.

At the morning session of the second day, Dr. S. H. Guilford, of Philadelphia, Pa., read a paper entitled "Crown- and Bridge-Work: A Protest against Some of Its Abuses," on which there was no discussion. The paper will be found at page 606 of the current number.

AMERICAN MEDICAL ASSOCIATION—SECTION ON ORAL AND DENTAL SURGERY.

The forty-fifth annual session of the American Medical Association was held in Odd Fellows' Hall, San Francisco, commencing Tuesday, June 5, 1894.

The section on Oral and Dental Surgery was called to order in Remembrance Hall, at 3 o'clock P.M., by Dr. Eugene S. Talbot, secretary, who read a letter from Dr. M. H. Fletcher, chairman, expressing his regret that illness prevented his presence.

Dr. C. L. Goddard, of San Francisco, was unanimously elected chairman.

Dr. Talbot, in presenting the program, explained briefly that the principal object of the section was to afford a help to the education of the medical profession in dental subjects through the publication of the papers read before it in the medical journals.

Dr. L. Van Orden, San Francisco, then read the annual address of the chairman, Dr. M. H. Fletcher, of Cincinnati, an abstract of which follows:

In recalling the progress of dentistry, which, especially in America, is almost a synonym for advancement, it will be noted that the changes relate more largely to the art than to the science of the profession.

Quoting from an editorial in the DENTAL COSMOS of April, 1894, to the effect that in its scientific phase the growth of dentistry has not, in this country, kept pace with its development as an art, the writer claimed that while it was certainly no discredit that the art has reached so high a state, the highest possible attainments in that direction cannot accomplish much without at least some knowledge of the science of the calling. With many so-called dentists, the only relief from the pain of toothache is the extraction of the offending organ. To properly diagnose the cause and relieve the patient requires a knowledge of the laws of health and disease, and these are only acquired by study of the facts brought to light, it may be by empiricism, but most likely by the untiring labor of men who have given time, thought, and labor to the subject. Years of training are required to establish the habit of scientific thinking. To an eminent physician, a patient, who had just asked the writer why, with all their advancement, dentists have not relieved their specialty of the horrors of the most frequent operation they have to perform, he had replied that it was simply lack of scientific advancement.

A recent editorial in one of the most prominent medical journals has the following: "The dentists of America are the best in the world, but they are nevertheless away behind the mark. We appreciate their ingenuity, their skill, their drills and dams, their composite fillings, and artificial teeth; they make the best kind of gold crowns, but do not deserve to wear them; this is because they do not sterilize themselves or teach their patients how to prevent caries. They are wonderful patchers-up of things half gone, but do not know how to prevent the going. There is hardly a dentist (there are a few) who works in an aseptic way or uses aseptic instruments. Some do not know better, some do not think it necessary. But both are wrong: the one class should learn, the other should think. How many dentists can tell surely when they are dealing with a syphilitic mouth? Yet if such a mouth is being treated, we do not believe that any one would like to be the next patient, though the dentist should wash his hands."

The address, then, as a further illustration of the public estimate of dentistry, referred to the decision by the Supreme Court of Missouri to the effect that dentists are not exempt from jury duty, as are physicians and surgeons.

We all possess the title of doctor, which is defined by the Century Dictionary to be "a teacher; an instructor; a learned man; one skilled in a learned profession." A master of science must be a thinker, familiar with the established facts in the sciences, and capable of applying them to the work before him, on his own judgment. With a large proportion of such minds in the ranks of dentistry, such questions as the doctor asked and such editorials as that from the New York *Medical Record* would have no point; but as it is, they cut deeply because they strike a defective place. The future of dentistry must progress on a broader line of culture, if she would hold her place.

The writer then referred to an address before the American Academy of Dental Science, by Rev. Reuen Thomas, in which the "Encyclopædia Britannica" was quoted to the effect that for long dentistry was practiced to a large extent in England as a superadded means of livelihood by persons engaged in other pursuits, and without any professional education whatever. The blacksmith, the barber, the watchmaker, and others of the same class were the dentists of villages and country towns, and even in some of the large cities; a condition which also prevailed largely in this country in the past, if men of seventy years or more could be received as reliable witnesses. Dr. Fletcher could point to an instance in his own city where a sign in a barber's window reads, "Teeth extracted, twenty-five cents;" and another where cupping and leeching adds to the income of the owner.

There are charlatans in both medicine and dentistry, but little, if any, above these barbers in proper requirements for their profession, who find patrons, or they would not exist; although the intelligent part of most communities not only values the profession at its true standard, but discriminates fairly between its individual members. If we wish a higher estimate, we must deserve it. The dental ladder may be high or low, but it certainly needs to be higher than it is. It is lengthening rapidly in some directions, especially as "patchers-up of things."

The "Encyclopædia Britannica" says that "dentistry or odontology is extremely limited in the range of its subject-matter; but it affords great opportunity for refinement of technical skill," showing that we are looked upon by thinking people as skilled artisans.

In the address before referred to, Rev. Dr. Thomas puts the point very nicely: "A learned man in our day is a man who knows everything of something and something of everything. Some of his knowledge must be microscopic, but most of the knowledge must be telescopic. He is minutely acquainted with some one thing, and generally acquainted with many things. Now, if a learned man is a man who knows everything about some one thing, a learned dentist should be a dentist who knows everything knowable about teeth." Farther on he says, "While, therefore, we pride ourselves on the wonderful advance we have made in dentistry and surgery and other departments of knowledge and achievements during the last century, there is a necessity for reminding ourselves of the tendency of our age of specialties to produce men in large numbers who are illustrations of *learned narrowness*, men whose minds are warped, sectarianized, and materialized, men whose world is a very much smaller world than it would have been if they had given serious heed to other studies than the bread-and-butter studies of life. Moreover, it ought to correct our tendency to conceit and self-congratulation when we remember that, with all our advances, there are some things—yes, many things—which animals and even insects can do better than we can do."

Combating the idea that the trend of his address indicated a pessimistic view of dentistry, Dr. Fletcher contended that he was fully alive to the fact that dentistry has reached a most remarkable position for a growth of fifty years, and that he is justly proud of being a member of such a profession, but for that very reason he is anxious that we fully comprehend our exact position. Our advancement has been in much the same way as that of many of the arts, and the real advance in dentistry is only comparable to these arts, excepting in a few points. We have established the cause of dental caries; the fact that the system will tolerate a pulpless tooth after the pulp-cavity and root-canal have been obliterated ; again, atavism and the etiology of the various deformities of the head, face, jaws, and teeth have been scientifically studied by the examination and record of thousands of skulls of human subjects. There is now in progress a creditable effort to establish scientifically the cause and proper treatment of pyorrhea alveolaris. Aside from these and their intelligent discussion, and that of the development of tooth-structure, he knows of nothing beyond the advancement made in several of the mechanical arts.

Let some man or men among us formulate a practical plan whereby dental students can be educated to think scientifically while they are being educated in the mechanical arts of the profession. Let some one tell us how to cut sensitive dentine and insert a permanent stopping without pain ; or, better, give us a practicable prophylactic treatment for dental caries.

The shortest and surest road to these desirable ends is in the proper mental training of the profession. A well-balanced mind comes only from broad culture. Science is considered by many who have not tried it or have gotten a wrong start, dry and uninteresting. There are few, if any, greater enjoyments than the acquisition of new truths. Sir John Lubbock says, "Culture may be gotten by constant and persistent effort to comprehend the phenomena and facts with which we are daily surrounded, and with which we hourly deal." When the desire for learning has fastened itself on the majority of our profession, we will have more scientific discoveries, and merit the name of a learned profession instead of "patchers-up of things." Then will we free our patients from pain and other disagreeable things. Then, too, as Rev. Reuen Thomas puts it, "The time will be near at hand when a visit to the dentist will have no more terror in it than a visit to the physician who simply feels your pulse, and looks at your tongue, and asks you the usual questions, and then gives you a bottle of sugar-coated pills."

Dr. W. J. Younger, San Francisco, in opening the discussion, expressed a feeling of dissatisfaction with the address, because it seemed to him it did not give dentists credit for what they have done. The writer does not seem to appreciate what dentistry has attained. There certainly has been a great deal of scientific work in dental circles during the last few years. As an evidence of this, the fact may be cited that the American Medical Association has acknowledged dentistry as equal in merit to the other specialties, and has adopted us as a distinct and recognized part of its organization in the formation of this section. Dr. Fletcher appears not to understand what dentistry has done. The speaker could very well remember when, forty years ago, the condition was as described in the address ; but dentistry has lifted itself up, has gone beyond the carpenter and the other artisans. We have, for instance, our colleges, in which a scientific basis, at least, is laid for the practice of dentistry.

Dr. Gilbert S. Dean, San Francisco, did not now care to discuss the points referred to by Dr. Younger, but the question of the standing of dentistry should be settled by others rather than by ourselves. There is no question that if we make ourselves a thoroughly scientific body, the fact will be recognized. It may take time to accomplish this, but it certainly will come.

Dr. L. Van Orden, San Francisco, felt that we could not gather all there was in the paper from one reading. In one sense, at least, its writer deserves our thanks. As a profession, we are a little given to self-gratulation. If you recall the progress which has been made in the various arts, you can but see what tremendous strides they also have made. The speaker had accepted such statements as the paper referred to regarding the unprecedented advances in dentistry, and he would confess that he was somewhat startled at the possibility that what the paper stated as the actual fact might be so. It is very possible that the paper is correct in its estimate. There is no doubt, however, that the dental profession has a purpose of progress; but unless it is pursued in the spirit suggested by Dr. Fletcher, there will not be much real progress.

Dr. Eugene S. Talbot, Chicago, thinks that it is important that we should recognize facts as they exist; the more so as the editor of the DENTAL COSMOS has lately taken up the subject of the scientific position of dentistry. This is a subject of great importance to us, and we have got to face it. When we call ourselves a profession we don't know what we do. We are not a profession. Most of what we do is mechanical, and we have got nearly to the end of our string in that direction. Take the program of any of our state meetings, and compare it with the program of fifteen years ago, and then say how much better that of to-day is than the older one. As an example, take the program of the Illinois State Dental Society at the last meeting. One of the first things is a paper on amalgam, but it is treated purely from the mechanical standpoint. Not any one knows what amalgam is, whether a chemical compound or a mechanical mixture. We know it will preserve a soft tooth better than gold, but we do not know why. There is hardly a paper a year on dental subjects which has a bit of science in it; very few with anything new in them. A man cannot in a week's time, or after he arrives at a convention, write a paper to be read before it that will contain anything new. That takes years of study. Take the subject of filling teeth with gold. There is nothing new on this line in the papers presented to-day. We have had hardly one in twenty years up to the average of those of forty years ago. In order to improve, we have got to get down to hard work along the lines of original investigation. Does the man who writes a paper nowadays give credit to those who did the original work? He does not. That has all been rehashed and rehashed till its source is almost lost. The speaker had never learned, until his first visit to Europe ten years ago, how to write papers. The English, German, and French, as Dr. Kirk says, know what science is. We should take up some subject in which we have an interest, a subject with which we are in love, and follow it steadily. The young man, for instance, should select such a subject, after which the first thing is to read everything that has been written upon it, digest the knowledge he gains, and write the facts down, giving due credit to those from whom they were gained. Then, after a while, he is ready to begin to study it. Lest it be objected that this preparation is unnecessary, it is proper to ask, Can you take up the microscope successfully without knowing what others have done with it? It takes years to learn what others have done, preparatory to any effective work, and after that it takes other years to learn something new on the particular subject pursued. In the speaker's view, it is better to write one paper in ten years which gives something really new and valuable, than to write one every year which is only a rehash of what has been said and done by others.

So long as we practice dentistry as we now do,—as a mechanical profession,—nine-tenths of the dental profession practice dentistry simply mechanically—if they can't cure a tooth, they extract it,—so long will we fail of proper recognition. The time has come when we have got to do something. The men in dentistry abroad are investigating, and they stand higher, so far as scientific dentistry is concerned, than we do. They have a better general knowledge when they begin the study of dentistry. We learn, as a rule, only the mechanical side. In the speaker's belief, there should be but one degree requisite to the dentist, that of M.D., which implies the possession of a knowledge of the medical sciences. The young man beginning the study of dentistry asks, "What is the use of a knowledge of chemistry to me? I am to fill teeth only." In the speaker's opinion, if he had a broad medical education, he would be better prepared to take up and cope with the difficulties constantly presenting.

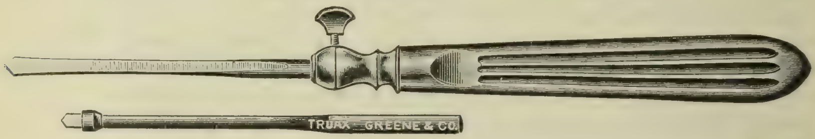
Dr. C. S. Lane, Oakland, Cal., thinks that dentists certainly have made creditable advances, and while we may be said to be able to do good patchwork, we are something more, are really good tooth-doctors. For himself, he is sure that he does more thinking nowadays than formerly, more studying, more doctoring, and gives his patients more instruction in the care of the teeth. The matter of the cleanliness and care of the teeth has received a good deal more attention at the hands of dentists during the last ten years than previously. We look into cases more carefully than we did, and we save roots, when the crowns cannot be preserved, better than we did ; we apply medicaments that overcome the adverse conditions better than we did. We are saving teeth and roots which were sacrificed then. There is, of course, a certain amount of crudity about dentistry yet,—its practice is comparatively new,—but our profession is taking on experience and acquiring skill and science. We ought to be proud of the vigorous growth of our profession ; of our success in inducing great cleanliness. In combating the diseases we are called upon to treat, we are fully as successful as other specialists. It is a good practice, and one which he is accustomed to pursue, to give patients a little clinic at the chair every time they are in it, and he finds that he has to tell them over and over again that the dentist's efforts are useless unless they attend carefully to cleanliness.

Dr. Talbot read a paper entitled "Empyema of the Antrum, and How to Treat It," of which an abstract follows :

Quoting Gray's description of the antrum of Highmore, Dr. Talbot stated his belief that it must have been written after the examination of a very few symmetrical skulls, since he had been unable to verify it in all cases after an examination of six thousand antra. In some cases, the shape of the cavity was just the reverse of that laid down by Gray ; in others, the antra were almost square, with round corners ; in still others a description was almost impossible, owing to septa or bulgings, with corresponding depressions and deformities of adjacent cavities. Sometimes the outer wall of the nose will be bent into the antrum twenty-five to thirty-three per cent. of its space, and *vice versa.* The size of the cavity also cuts quite a figure in regard to its position and relation to surrounding parts. In neurosis and degeneracy, one side of the antrum may develop to twice the normal size, forcing the nasal cavities to the opposite side, and reducing the antrum of that side to the size of the end of the little finger, located almost entirely within the malar process. The walls on this side, too, are very thick, so that a drill would have to pass from one-half to three-quarters of an inch through the alveolar process to reach the cavity. These abnormalities explain why it sometimes occurs that, in drilling into the antrum, the operator actually passes the drill into the floor of the nose. Again, the antra are often almost entirely obliterated, and they are frequently divided into compartments by bony septa, making it difficult to find the lowest point of the cavity. The opening into the middle meatus of the nose varies from the size of a crow's quill to a space large enough to admit the end of the little finger.

Empyema of the antrum has been variously ascribed to an extension of inflammation of the mucous membrane of the nose from cold, and to alveolar abscesses. Some years since, the author had examined 6000 antra, finding, in the same skulls, 1274 abscessed molar teeth, of which seventy-six, or about six per cent., extended into, and apparently discharged into, the antrum. Septa were found in 963 cases. In the treatment of 384 pulpless superior molars in twenty-four years, only four cases of diseased antra were observed. Dr. M. H. Fletcher, of Cincinnati, had found similar facts in 1000 antra which he had examined,—viz, 252 superior molars abscessed, of which twelve had perforated the antra. Of 224 pulpless molars treated in his practice, only one was accompanied by pus in the antrum. The conclusion seems clear that diseased antra are rarely due to abscessed teeth, and that, owing to the uncertain development of the bony frame-work of the antrum found in neurotics and degenerates, inflammation may be expected to extend into it from the nasal cavities (especially when the openings are large), as the result of cold.

FIG. 1.

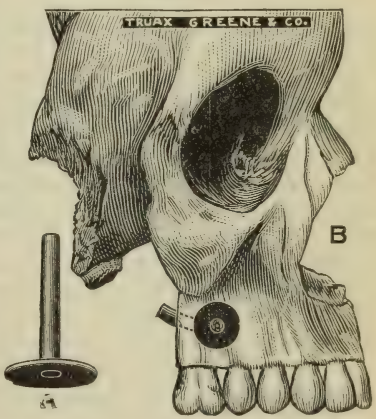


It has been common, to secure drainage of the antrum, to extract teeth or roots, and drill perpendicularly through the alveolar process. As has been shown, the antrum cannot always be reached in this way. From the studies before referred to, both Dr. Fletcher and the author had independently reached the conclusion that the best place to open the antrum was at the base of the malar process, midway between the roots of the second bicuspid and first molar. In this position the lowest point of the cavity is nearly always reached, and the possibility of entering the nasal cavity avoided.

In connection with the reading, Dr. Talbot showed a flanged hard-rubber tube for drainage of the antrum (Fig. 1), with which he had been quite successful. It has the advantages of cheapness, can be softened in hot water and molded to any position, is easily kept clean, and readily adjusted. He also showed an instrument (Fig. 2) for opening into the antrum, for the use of medical men who have not the engine and bur at hand.

Dr. Younger thought the paper excellent, and the method of opening into the antrum the best to be found. Two years ago a case had come into the speaker's hands, in which a tube used to secure drainage from the antrum had been allowed, during its removal, to slip into the cavity. The patient was a lady seventy-four years of age. Immediately, though of course without alarming the patient, an endeavor was made to recover the tube. Chloroform was given, the patient was kept under its influence for two hours, and for an hour and a half the search was kept up, but without avail. Some months later, on his return from a somewhat prolonged absence from the city, he was called in, and found the patient much worse and steadily growing feebler. He thought it probable that a part of the tube was still in the antrum, but he was unable to find it, although he used cocain, enlarged the opening, and searched for an hour and a half. The operation, however, benefited the patient, and for a while she seemed better, but the old symptoms soon returned. He again operated, having in the mean time concluded that the missing tube was behind or over the inferior turbinated bone, and for the purpose of searching for it had a probe made with which he could thoroughly explore every portion of the sinus. It was found in fifteen minutes.

Fig. 2.



Dr. Dean. Was there any local formation of pus or local inflammation, and general rise of temperature?

Dr. Younger. We supposed so, on account of the improvement in the patient's condition after the operations.

Dr. W. G. A. Bonwill, Philadelphia, had had but three cases of antral disease which had come from the teeth. It is a question how far we, as dentists, may treat antral cases, because they have given so much trouble to the best general surgeons. Much as he loves a tooth, and much as he tries to save them under almost all circumstances, he thinks he should prefer, in case of antral trouble, to extract a tooth so as to have plenty of light. It is well, of course, not to make unnecessary extra openings in surgical operations; if there is already one, we should try not to make more. After opening the cavity, we ought to be able to drain it thoroughly. If this cannot be accomplished with cotton, then wool may be used, which does very well in many cases. Then, unless there is diseased bone to be removed, we ought to be able to medicate readily.

Dr. Van Orden has sometimes asked himself if he is always able to recognize antral trouble. In this connection he recalls a case in which, if he could get it back into his hands, he would certainly attempt to cure a bad case of nasal catarrh by an operation upon the antrum. At the time this case came to him he treated it, the condition improved, and he sent it to a specialist who didn't seem to pay much attention to it. Dr. Talbot says that only a moderate number of abscesses in the upper jaw complicate the antrum. Would not the engine-point be less painful in operations upon the antrum than the instrument which Dr. Talbot describes, and therefore preferable?

Dr. Talbot. Yes. The paper stated that the instrument referred to was for the use of physicians and surgeons who do not have the engine.

On motion of Dr. Walter F. Lewis, it was voted as the sentiment of the section that Dr. Talbot's paper should be read before the Dental Congress next week.

Dr. Talbot had tried to point out, both in the paper now under discussion and in the remarks which he had made upon the chairman's address, that it is only by hard study that dentists can hope to improve the scientific basis of their profession. This paper now under discussion has been eighteen years in preparation, and to reach the deductions stated in it required the examination of over twenty thousand skulls in this country and in Europe. There are facts given in that paper which were never before publicly stated. Dr. Fletcher, as the result of an entirely independent examination, agrees with the conclusion that the antrum cannot be depended upon as to size,—that is, whether it is as large as one's little finger or as a hen's egg, and extends over to the roof of the mouth, cannot be determined from appearances. The speaker has seen skulls from which it would have been impossible to extract a tooth on one side of the mouth without going into the floor of the nose. Both himself and Dr. Fletcher had reached the conclusion, each without the other's knowledge, that the point named in the paper, between the second bicuspid and first permanent molar, was the proper place to enter the antrum in operating. You must not lose sight of the septum which divides the antrum into two chambers. If you go up into only one antrum, the patient's head should be laid first on one side, then on the other, so as to drain both antra thoroughly. Treatment after opening should be simple. Cleanse out with syringe, using warm water or a weak solution of listerine or boracic acid, or something which will not injure the mucous surface. Many specialists use too strong remedies. Very simple treatment only is needed: cleanse thoroughly with warm water, and let nature do the rest.

In reply to queries, Dr. Talbot said that in disease of the antrum the dentist should take entire charge of the case, which he should be competent to treat. He does not consider a man a real dentist who cannot do so, though he fears there are comparatively few who are able to handle such cases successfully. He would not attempt to open into the antrum without knowing that it was necessary. He might go so far as to extract a tooth, but should then wait two or three months, if there was any doubt, to give time for a cure of the trouble by nature's help. Then, when sure that it was required, he should make the opening. In mild cases of antral trouble, where transmitted light gives no indication, he should treat the patient constitutionally. Ninety-nine out of one hundred such cases are due to inflammation of the mucous membrane, as from the effects of grip or the inhalation of extremely cold air.

Dr. C. S. Lane, Oakland. Is the drainage-tube a necessity in cases where the antrum is opened? Will it not take care of itself without this aid?

Dr. Talbot. The mucous membrane heals up very quickly if allowed to,—sometimes in twenty-four hours.

Dr. Lane. Some surgeons claim that it never does so, and my experience is that unless we do something to assist it, it does not readily heal. The idea advanced by Dr. Talbot seems new and well worth thinking of.

Dr. Dean. By this tube which Dr. Talbot shows, we have practically a valve which prevents the ingress of *débris* from the mouth. A paper like this should be studied before one is prepared to discuss it. A year from now he might be able to speak intelligently upon it.

A paper by Dr. W. Xavier Sudduth, Minneapolis, entitled "The Antrum of Highmore in its Relation to Vocal Resonance," was read by Dr. Jewell. An abstract follows:

Dr. Sudduth remarked that while musical literature abounds with accurate and scientific descriptions of musical instruments, which are all poor copies of the original instrument, the human harmonium, next to nothing can be found regarding the science and art of voice melody and oratory, and still less treating of the design of the organs themselves. While the advice of an expert is secured in the selection of an instrument for a would-be musician, no scientific examination of the vocal organs of a child is made to determine their character and condition before the "education" of its voice begins. If an organ or piano gets out of tune, an expert is sent for at once; the human vocal organs are as readily amenable to scientific treatment. With a laryngoscope fitted with a small incandescent electric lamp, pathological conditions in the posterior nares and vocal cords, as well as deficiencies or abnormalities in the antrum, may be determined. The vocalist of the future need not remain in ignorance of the condition of his vocal organs, and a more rational system of instruction, based upon purely scientific methods, will be adopted; any physical inaptability which will forbid a successful career will be discovered at the beginning. Instruction cannot make up for physical incapacity in the vocal organs.

Study of the anatomy of the vocal organs demonstrates the existence of a definite type, which is essential to success as a vocalist or orator; but the possession of correctly-formed vocal organs does not insure that the possessor will become a successful vocalist, as there are other essentials, which are not pertinent to this paper, no more than the pathological conditions which may intervene to prevent perfection during the progress of training.

The paper then described the formation of tones by sound-waves set in motion by the vocal cords, which are influenced by the resonant cavities, any change in the form or physical condition of which will affect the range and quality of the voice. Size of the cavities also seems to have a more or less marked influence, the range and perfection of the voice corresponding to their capacity. There is a correspondence between the breadth of the face and the size of the resonant cavities, so that a study of the physiognomy of an individual will afford a very accurate idea of the possibilities for him as a vocalist;

provided no internal pathological conditions exist, which latter may be determined by laryngoscopic examination. There is no question that there is a pronounced type for vocalists and orators, indicated by more or less pronounced features. We seldom find a successful vocalist with what may be termed a pretty face. The voices of such may be sweet, but they lack power. Dr. Sudduth instanced, in support of his proposition, a large number of prominent individual singers and orators, as possessing the characteristic physiognomy. Among races, the Negro, whose plantation songs are known the world over for their melody, possesses the points cited as essential to good vocalists, and undoubtedly has large resonant cavities. The Celtic and Norse races were also referred to as possessing the general characteristics. On the other hand, the Japanese and Chinese, who speak and sing in a monotone, with little or no range of voice, have narrow and short faces, smooth features, small eyes, and receding foreheads,—all indicating small resonant cavities. The American Indian, who seldom or never sings, has a comparatively long, narrow face, more or less depressed in the region of the maxillary sinuses, which gives prominence to the malar bones and limits the size of the antra. A study of the face of the Goddess of Liberty which graces the American dollar, and which may be taken as representing the American type, so far as there is one, reveals the cause of the high-pitched voices in so many of those who boast the bluest blood, in the narrow face, with high arch and a tendency to the suppression of the lateral incisors, indicating small or deficient antra.

The nervous and bilious temperaments seldom if ever produce noted vocalists or orators ; the basal temperament of this class being usually sanguine, though sometimes a sanguo-bilious or nervo-sanguine temperament may be found among them. These temperaments are marked by broad oval faces, firmly-set jaws, and a more or less square articulation of the teeth, all indicating harmonious and full development of the maxillary sinuses.

Passing to a more detailed consideration of the resonant cavities of the head, the writer stated that a considerable experience, personal and clinical, had led him to look upon the antrum of Highmore as an important adjunct to vocalization, adding materially to the quality of the voice and perhaps also to its range. Dr. Sudduth then gave a detailed description of the antrum and the frontal, sphenoidal, and ethmoidal sinuses, and the process of their formation, based upon original studies, and quoted from Bosworth and Mary Olmstead Stanton to show that the office of the nasal cavities and the frontal sinuses as resonators was recognized, though nowhere could he find any reference to the maxillary sinuses as accessory resonant cavities. He had been led to attribute to the antrum an important rôle in vocalization by the fact that when the outer plate is trephined in the treatment of suppuration of the antrum, the bone is never replaced ; but the opening is closed by extension of the mucous membrane, which remains sensitive for a time, so that the patient can detect the least vibration of the air inclosed in the cavity.

The human voice belongs to the class of instruments known as "reeds," and the maxillary and frontal sinuses act as sounding-boards, adding immeasurably to the richness and fullness of the tones produced.

In conclusion, the writer presented the following summary of his views: That the maxillary sinuses are developed with the growth of the individual after birth; that in some instances one or both are absent or but slightly developed; that they have no definite form, and vary greatly as to size in different individuals; that there is a correspondence between the breadth of the face and the size of the antra; that in some instances they are divided into compartments by osseous walls, which affect resonance; that they are cavities intimately connected with the nasal fossæ, being separated therefrom, in part at least, by a thin membranous partition; that the air contained in these cavities vibrates in harmony with the tones produced by the vocal cords; that this vibration is most appreciable when the tones produced are full of melody, as in certain kinds of church music and negro melodies; that it is more prominent in singing than in speaking, unless a special declamatory effort is attempted; that there is a type of individual to which the successful vocalist and orator belongs, and which is indicated, among other things, by a considerable but harmonious development of the maxillary sinuses; that variation in the size and shape of the resonant cavities, when present, undoubtedly affects their value as resonators; and finally, that certain races, noted for their melodious voices, are distinguished for the conformity of their physiognomy to the type above given for vocalists.

The section then adjourned till 2.30 P.M. of the next day.

SECOND DAY.

The section was called to order at 2.55 P.M., Chairman Goddard presiding.

The discussion of Dr. Sudduth's paper was taken up.

Dr. Talbot regretted Dr. Sudduth's absence, because he preferred, when he attacked the position assumed by a writer, to have him present. In this case he takes decided issue with the arguments made. Dr. Sudduth has mentioned a number of singers, most of them exceptionally fine artists, who he says all had large features. It is a known fact that certain forms of disease are the result of neurological conditions. Great singers—and this is especially true of those mentioned in the paper—are all geniuses in their way, and genius is now laid down in medicine as a particular form of insanity. A man who is an expert in invention, in art, is suffering from a form of insanity. All his ability runs in one direction. We shall find, if we study the lives of great geniuses, that almost always they are of no account in any other direction than that in which their pre-eminent genius is acknowledged, this particular faculty having been developed abnormally at the expense of the other parts of the brain, which are accordingly weak. If the brain develops in only one direction, the osseous system has to suffer, and accordingly we find arrested development of different parts of the osseous system. If a large nasal cavity, large antra, and large jaws are due to the fact that the individual began to sing early and in that way developed them, just so we can develop the maxillary system. What effect the antrum has upon the vocal sounds produced he cannot see, and he thinks that if we examine the skulls of noted singers after death the antra will be found much like the antra of others,—some one way, some another.

Gray says the opening from the antrum into the nares is of the size of a crow's quill. The speaker has seen these openings so large that one could pass a finger in. It is claimed by the laity that individuals with high vaults make the best singers, which he doubted. Dr. Sudduth speaks of roots of teeth extending into the antra. This is very rare, though it is occasionally seen.

Dr. G. S. Dean was not prepared to discuss the paper, which touches upon a subject which we, as dentists, ought to know something about. If it is true that the antrum and the cranial sinuses are concerned in voice-production generally, we ought to know about it particularly, as we may, in time, learn how to develop the antrum. Dr. Ottolengui tells how he moved the teeth of a public singer and the voice improved. Dr. Sudduth has treated of the voice as a string instrument; the speaker thinks it more of the character of an organ-pipe. The first principle of sound reinforced by a column of air is familiar to all. Take a string which by itself can be heard only three feet away; with a sounding-board to reinforce it, its tones will fill a room. The organ pipe is another illustration. Among birds, the owl has large cranial sinuses, but he is not much of a song-bird. So in the animals: the elephant has the largest cranial sinuses of all, yet he has not a very good voice. Dr. Sudduth makes the point that when the nasal passages are closed, as by catarrh, the voice becomes what is called nasal, although it is in reality absence of the nasal quality. As a general principle, the greater the volume of air set in motion by it the greater is the volume of the sound. The point brought out by Dr. Sudduth, that we as dentists ought to familiarize ourselves with the mechanism of sound, is important. For himself he proposed to study the subject presented.

Dr. Van Orden. If the antrum is not for the benefit of the voice, what is it for? It seems to be of little value unless it should be for this, or for helping the nose out in blowing it. It would seem well worth while our looking into the anatomy of the subject further than the text-books take us.

The discussion was closed.

(To be continued.)

MIDWINTER FAIR DENTAL CONGRESS.

THE Midwinter Fair Dental Congress held its sessions in the hall of the Academy of Sciences, San Francisco, commencing Monday, June 11, 1894. There was a large attendance of the dentists of the Pacific Slope, with an occasional representative from other sections, the names of nearly three hundred members being registered.

FIRST DAY—*Morning Session.*

The congress was called to order at 11 o'clock A.M. by Dr. L. A. Teague, chairman of the Executive Committee, as chairman *pro tempore.*

Supervisor J. G. James read a brief but pleasant address of welcome on behalf of the city of San Francisco, and was followed by Mr. Irving M. Scott, president of the Union Iron Works, whose speech was felicitous, full of witty allusions to dental history. He bade his brother dentists, claiming relationship by virtue of his profession and the experiences he had had in the filling of cavities and the plugging up of holes in armor plates, a hearty welcome, and tendered them the use of the company's tug to visit the iron works, where they would see, in place of Knowlton's continuous-gum dentures, a permanent gun indenture; in place of Vaughan's anchored plate, the armored plates of the cruiser Oregon.

Calling Dr. Knowles to the chair, Dr. Teague then read his address, of which an abstract follows:

Recounting the history of the congress, the idea of which had its origin in the failure of the effort to induce the American Dental Association to hold its meeting this year on the Pacific Coast, Dr. Teague traced briefly the progress of the organization which had led to the present gathering to "delve into a science infantile in years, but venerable in accomplishments; a science that is an art preservative, a beautifying art, a boon to humanity, which is growing more in need of its assistance year by year." Many themes will be discussed during the sessions which will tend to interest, enlighten, and instruct. We are sure to derive great profit from the exchange of ideas and the relation of experiences. We shall have the opportunity to compare the degrees of excellence between operators from all parts, and it is thought the Pacific Slope will be able to show that among its practitioners are men who are known throughout the world as benefactors of their kind. Perhaps environment and necessity created the conditions that raised the pioneers to a high pedestal. The world is indebted to these pioneers for many of the comforts incidental to the operations now practiced. Truly, it is a grand record, and we of the succeeding generations are the recipients of a noble heritage.

The combination of platinum and gold, known as colored gold, is the invention of Dr. Charles E. Blake, of San Francisco, as is also the facing of porcelain, backed on platinum shells, for bridge-work. The combination of rubber with gold is the invention of the late Dr. G. W. Cool, of San Francisco. The improvements in crown- and bridge-work known as the Richmond were made by the former San Francisco dentist of that name. The rubber-dam was used by Dr. H. H. Pierson of Sacramento, before Barnum gave it to the profession. The bayonet root-canal drill was invented by Dr. F. A. Brewer, then of San Francisco, now of Fresno; osteoplastic cement by Lindquist of San Francisco; the gold crown by Dr. J. B. Beers of the same place. The treatment and cure of pyorrhea alveolaris was given to the profession of San Francisco years before Dr. Riggs's work was known on this coast. Regulation by silk threads, the use of granulated chloride of zinc to obtund sensibility, the fixing of natural crowns on foreign roots, the suggestion of outside force by double bandage on the head to reduce protrusion of front teeth, the inlaying and restoration of lost portions of teeth by pieces of artificial or natural teeth, the lining of teeth with gold to prevent amalgam from staining the crown, the perfection of transplantation and replantation, the reduction of elongated teeth and artistic remodeling of natural crowns, the prevention of facial deformity and disfigurement by alveolar abscess discharging through the face, the use of running water to obtund pain, the removal of necrosis by lactic acid, the denudation of surfaces by ammonia to create a healthy granulating surface, the elongation of retracted gums, and last, but equal to any other in importance, the implantation method by Younger,—these are what California has added.

The work of this congress will redound to the good of all concerned. Let us, therefore, make the most and the best of it, so that the Pacific Coast, as well as the State of California, may be able to have annual gatherings and greetings. Let us hope also that the educational feature will not be confined to the dental practitioner, but that it may become universally patent to laymen that the fundamental principles of the conservation of the teeth should be learned by the adult and taught to the child. Let us hope that the elementary principles of odontology as well as physiology will be taught in our public schools, so that parents may know the importance of taking care of deciduous teeth and first permanent molars, and thus render the path of the dentist less thorny and the troubles of dentition more remote.

The roll was then called by the secretary of the Executive Committee, Dr. W. Z. King, of San Francisco, ninety-eight delegates answering to their names.

After an invitation from Professor Harkness to examine the various collections in the Academy of Sciences had been accepted, the congress proceeded to the election of officers, Drs. L. Van Orden and J. W. Hayes being appointed tellers.

For president, Dr. Teague was placed in nomination by Dr. T. N. Iglehart, but promptly declined.

Dr. Wm. J. Younger was then nominated, and on motion the nominations were closed, and the secretary by direction cast the ballot for Dr. Younger, who was thereupon declared elected unanimously.

For vice-presidents the following gentlemen were chosen in the same manner: Drs. Warren De Crow, San José, Cal.; F. H. Metcalf, Sacramento; Geo. H. Chance, Portland, Ore.; F. W. Bliss, Santa Cruz, Cal.; J. G. Parsons, San Diego, Cal.; E. L. Townsend, Los Angeles; W. G. A. Bonwill, Philadelphia; E. W. Biddle, Healdsburg, Cal.; W. E. Burkhart, Tacoma, Wash.; R. H. Cool, Oakland; L. L. Dunbar, San Francisco; P. T. Smith, Denver, Col.; A. B. Dunford, Salt Lake, Utah; I. N. Demarest, Santiago, Chili; W. R. Bird, Los Angeles; A. F. Merriman, Sr., Oakland; L. C. Goddard, San Francisco.

The following additional officers were also elected: Dr. W. Z. King, secretary; Dr. Chas. E. Post, San Francisco, assistant secretary; W. T. Reid, Sacramento, corresponding secretary.

The congress then adjourned to 2.30 P.M.

Afternoon Session.

The congress was called to order by the chairman *pro tempore* at 2.40 P.M., and Dr. Younger, the president-elect, was escorted to the platform by Drs. Dunn and Roberts, and then formally introduced to the congress by Dr. Teague. On assuming the gavel, Dr. Younger asked for time to prepare a suitable acknowledgment of the honor conferred upon him, which he promised by the morrow.

Drs. Teague and Hicks were then invited to seats upon the platform.

A paper by Dr. A. H. Sawins, of Denver, on "The Sheaths of Neumann and their Contents," was then read by Dr. Walter F. Lewis, of Oakland. An abstract follows:

Referring to the search for obtundents, the writer declared his disbelief in anything like a specific as a local application. The sensitiveness of the dentine resides in the soft protoplasmic fibers (Tomes's fibers). Describing the anatomy of the fibers and of their sheaths (Neumann's), he found in the structure of the latter a peculiarly modified form of protoplasm with a large per cent. of phosphorus, and in its indestructibility in chemicals, the reason for his belief, it being thus quite impossible for any medicine to reach the soft fibrils. When the sheaths have been destroyed, so that the tubes are left open and the fibrillæ exposed to the action of drugs, there is no doubt that such fibrils can be successfully obtunded, and perhaps others, through the granular layer. Whether or not nerve-filaments enter the dentinal tubules is not surely determined, but nerves need not exist there in order that afferent impulses may be transmitted to the brain. The protean modifications of the protoplasm will, in the writer's opinion, supply a sufficient explanation, in support of which he adduced illustrations of protoplasmic communication of afferent impulses without the presence of nerves. Physiology teaches that the impulse is not the contraction of protoplasm, but a kind of discharge which precedes the contraction. This would lead us to strongly suspect that the sensation aroused by a revolving bur tearing off the sheaths and their fibrils is due not to the presence of actual nerves in the fibrils, but to this sensitive protoplasm receiving and transmitting, by contraction or otherwise, the impulse from the instrument to the nerve-endings in the pulp. Probably the protoplasm in these fibrils, by constantly receiving and transmitting mechanical and thermal impulses from the surface of the tooth, actually becomes more nerve-like in its character as age advances, up to a certain period.

Dr. L. L. Dunbar, San Francisco, said that the paper was difficult of discussion because of the difference of opinion among the authorities as to the structures referred to in the paper. Dr. Sudduth, and those who believe with him, deny, while the New York school of histologists affirm, their existence. Dr. Sudduth insists that the original formation of dentine is of the nature of a bone-formation, and that there could be no connection for nutrition if the dentinal sheath, as described by Neumann, existed. The speaker inclines to Dr. Sudduth's view; he doubts, however, if any large percentage of dentists can tell what the sheaths of Neumann are and how they are formed. In teaching histology he himself has failed to mention them, except to say that certain facts seem to disprove their existence as a separate membrane. The author of the paper has evidently intended to point out a practical way of treating sensitive dentine. Dr. Dunbar is inclined to think that the sensitiveness of dentine is due to a ganglionic action through the dentinal fibrils. We ought to be able to demonstrate by chemical means the presence of the sheaths of Neumann, if they exist. By submitting specimens of dentine to the action of the proper reagents, the contents of the sheaths should be dissolved out and a series of tubes be left; but no such thing is found. As to the so-called sheaths of Neumann forming a serious barrier to the treatment of sensitive dentine, he very much doubts it.

Dr. S. E. Knowles, San Francisco, thinks the purpose of the paper was to put before the profession a practical method of treating sensitive dentine, to do which the writer had taken an ingenious way. The ground has been taken by some investigators that the existence of the tubes in dentine was due to post-mortem changes,—that is, to changes in the structure of the dentine analogous to that which occurs in the blood when the fibrin is coagulated. It is not to be doubted that dentine is permeated with something which will transmit sensation. All matter will transmit vibrations communicated to it. Some substances conduct heat, some light, some magnetism, and many authorities now believe that all these forms are different manifestations of motion. Now, the idea of a protean single cause for all these sensations is plausible. But there is another explanation of the difficulty of obtunding sensitive dentine which seems to be better; the circulation through the tubes is sluggish, and consequently drugs which act satisfactorily in other places fail here. Cocain, when it first came out, seemed to act satisfactorily in dentine, and the problem of obtunding dentine was thought by many to be solved. Later experience shows that cocain will act effectively but slowly. We have, so to speak, to pickle the dentine before the effect is had. Dr. Dunbar, in referring to the bone-like condition of dentine, denied the existence of the sheaths of Neumann.

Dr. Dunbar. One difference between bone and dentine is the manner of their nutrition. He claims that there is a demonstrable circulation in dentine, and the idea is as old as dentistry. Teeth are nourished, after they are once formed, through the medium of this circulation, and they could not be if these sheaths were so impervious as they have been described.

Dr. Knowles. Dead teeth would be less likely to show the structures than those freshly extracted. There is only about three per cent. of organic material in the enamel, and if there is any vitality in this structure it must be of a very low grade. One might as well speak of feeling in a cobblestone as sensation in enamel, which holds the same relation to the dentine as the epiderm does to the true skin. If enamel has vitality, it is the only superficial tissue of the body which retains it.

Dr. Dunbar. As to the existence of nerve-filaments in the dentinal fibrils, that seems demonstrable by a simple practical test. You all know that if there is anything between the teeth its general nature is determined by the touch. It is probable that there are tactile corpuscles at the ends of the tubuli, though this is only the speaker's notion, and has not been proved. In the same way as the finger-nail is affected by the substances which it touches, the stratum granulosum may be affected, and the fact that differences in the texture of various substances placed between the teeth simply are known by their feel to the teeth, seems to demonstrate the presence of tactile corpuscles in the interglobular layer.

Dr. C. S. Lane, Oakland, would like to know from Dr. Dunbar what medicine he would use to obtund sensitive dentine.

Dr. Dunbar replied that he had found carbolized potash, with water enough to dissolve it, acts as a mild cautery, and is very excellent. Where there is exposure, a saturated solution of nitrate of silver will obtund.

Dr. A. F. Merriman, Jr., Oakland, read a paper entitled "Loop Anchorage in Gold Fillings," of which an abstract follows:

Dr. Merriman did not advocate the use of his method of anchorage in all cases, but he claimed that it is useful under the following circumstances: 1, in very large crown cavities with frail walls, where the patient cannot endure a long operation; 2, in starting gold in large compound cavities; 3, in deep labial or buccal cavities; 4, in difficult cavities in porcelain teeth; 5, in all cavities which are to be lined with white cement.

The *modus operandi* is as follows: After removing most of the decay and weak points, cut margins smooth, polish, and rinse thoroughly; adjust the rubber-dam, unless already in place, and having thoroughly excavated the cavity and wiped with pure carbolic acid, and capped the pulp carefully if near, have the bracket table cleared of all unnecessary instruments, and cut several strips of No. 120 gold four times the diameter of the cavity one way and one-half the other. Suitable cylinders of standard gold, also some No. 30 if an exquisite finish is required, must be provided, the spirit lamp be ready, plastic instruments at hand, and cement on glass slab. Mix cement quickly with a flat spatula to the consistence of soft putty, roll it into a rope, carry to the cavity with a pointed small spatula, quickly pressing thoroughly into the cavity until at least one-third is filled, lining the walls perfectly, but keeping away from the margin if possible. While the cement is still plastic, quick as a flash place a strip of the 120 gold over the cavity, leaving the ends protrude equally, carefully adjusting in the center, and then holding it there with a suitable instrument with the left hand; with an egg-shaped burnisher quickly press the strip slightly into the plastic; put more of the cement into the cavity, allowing it to press against the walls in all directions. Do not put in too much, and do not allow it to remain against the margins. Press a gold cylinder, one-half the diameter of the cavity, slightly into the cement, which ought to be still a little soft; hold this with an instrument in the left hand, fold down one of the protruding ends of the gold strips, condensing with hand pressure, then the other end, folding it across the first with perhaps another cylinder intervening, then condense thoroughly. If more strength is required, use two or three strips in the loop; and if the opposite wall is frail, making it difficult to get a slight groove, resort to a double loop, giving four ends to bring down, which is especially desirable for a large contour compound filling. The writer, however, would not recommend this method in contour work, except where the cavity is so sensitive as to make it difficult to get either groove or retaining pits. Remove any cement which may be against the margins, blowing away with hot-air syringe. The work up to this point should not occupy more than ten minutes, and the cavity remaining to be filled should be about the depth of the enamel. This is filled in the usual way on the foundation of oxyphosphate and gold. A modification of the loop can be used in irregular cavities, if the entire cement is put in the desired depth and then pressed away, inserting one strip of gold and then pressing cement against it.

The advantages claimed for this method are: 1, perfect filling in half the time; 2, less metal inserted in the tooth; 3, gains the advantage of the holding qualities of the oxyphosphate; 4, extensive cavities can be filled before patient or dentist is worn out.

Dr. Merriman then passed around a tooth filled by his method cut in sections to show the work. He stated that the loop in this case was of No. 30 (Stubs's gauge) rolled gold, which he recommended in contour cases and very large fillings where great strength is required.

The discussion was opened by Dr. J. N. Dunn, of Oakland, who commended the idea suggested in the paper as excellent in some cases. We all like to perform our operations as well and with as little trouble as possible. There have been numerous ideas suggested as to methods of filling cavities. The idea put forward in this paper is intended to make the filling of such cavities as it is adapted to comfortable to the patient and easy for the operator. The method is not, however, suitable for all cases, and the places where it is to be used should be only those to which it is adapted. If the tooth is sensitive, the floor should be covered by cement. If the cavity is deep, extending near to the pulp, the plate may conduct heat and cold, and this may kill the pulp. The benefits to be derived from the operation presented by Dr. Merriman can be more clearly seen by examining the specimens which will be passed around than by anything that can be said.

The subject was passed, and a paper by Dr. Alton Howard Thompson, entitled "A Study of the Bicuspids," was read by Dr. J. J. Giusti, of San Francisco. An abstract appears below:

Dr. Thompson, starting with a reference to the lowest animal forms in which crushing teeth are found, the crustacea, and some insects in which there are cusped prominences or tuberculated crowns on the triturating plates, or stomacholiths found in the stomachs or gizzards, traced at length the development of the bicuspids of man through the various orders of mammals in his evolutionary history, showing in detail the variations in the premolars as found along the line.

In man, as in the higher apes, the upper premolars are of bicuspid form, the crown being complicated by the addition of the internal cone to the primitive external cone, the tooth being thereby made a double canine. The internal cusp of the bicuspid premolar is formed by the raising of the internal cingulum to form a large tubercle, which corresponds with the external cusp except that it is not so sharp and is usually of lesser height. They differ conspicuously from the premolars of the anthropomorpha also in having but one root (except that sometimes the first bicuspid is bifid, and when it is single there is always a groove on both the anterior and posterior sides of the root, indicating a tendency to bifurcation), while the premolars of the apes have three roots above and two below, just like the true molars. Occasionally three roots occur on the bicuspids above and two below, but these examples are merely reversions to the primitive form of this tooth, and are not normal in man.

The outline of the upper bicuspid is a round spear-shaped oval, the angles all being reduced from the rough shape these teeth present in lower forms. The oval is of course the reduced rudiment of the sharp triangular form of the premolars of early fossil typal mammals and of the insectivorous and quadrumanous forms.

The buccal face of the upper premolar is typically of a decided spear-shape, which is very marked in the lower mammals, in which the outer cusp rises sharp and prominent, with a strong ridge leading from it up to the cervical border. The marginal ridges descend rapidly from the point of the cusp to the proximate margins, and these margins are often raised into decided cingulums or even sharp cusps, as in the insectivora, with grooves leading up to the cervical border on either side of the central ridge. In man these are all reduced so that the buccal face is a rounded oval with more or less conspicuous markings of the original angles, ridges, and grooves of early species. It follows, therefore, that the buccal face of this tooth in man resembles somewhat the labial face of the canine, but it widens more rapidly from the cusp, giving this a blunter appearance.

The lingual face is more rounded in man, and displays a fullness of form that recalls the prominent marginal ridge in lower forms before the cingulum was raised to a tubercle. The mesial and distal faces are round or ovoid, being fuller than in lower forms where the triangular form of the crown made wide V-shaped spaces opening toward the tongue. In man this space is closed, except in some few instances in which there is an approach to the primitive V-space. As a rule, the bicuspids are in close contact across the proximate faces and marginal ridges. The crown tapers more abruptly toward the neck also, which is perhaps more constricted than in lower forms.

The second upper bicuspid in man is less angular and more rounded in every direction, the cusps are less sharply outlined, and the dividing groove is less distinct than in the first. It seems to be more reduced and rounded in every direction.

The distinctive feature in the architecture of the upper bicuspid is the formation of the crown and of two dental cones. These teeth are very weak as regards their mechanical strength and resistance to force in mastication, for if the proximate marginal ridges connecting the cusps happen to be destroyed by disease the crown is liable to be split by the occlusion. This weakness is the result of the imperfect fusion of the transverse triangular ridges which are cut in twain by the antero posterior groove, which usually extends downward to make a fault in the enamel. Owing to this defect these teeth are mechanically very weak. In the quadrumana this transverse ridge is continuous, the triangular ridges descending from the cusps are fused together, and the crown is in consequence very much stronger than in man.

It is to be noted that the upper bicuspids are the only members of the premolar series in man which are really bicuspid in their typical form. The second lower bicuspid is decidedly tricuspid, and the lower first bicuspid is more of a canine than a bicuspid in its usual typal form, because the inner cusp is almost suppressed, being rarely as large as the buccal. In fact, the crown looks like a canine with a cingulum raised upon its inner face, for this cusp is more of a cingulum than a cusp, although it varies much in size. This cingulum is a rudiment of the lingual talon on the lower premolar of the moles. The outer cusp is long and pointed like a canine. A strong ridge connects the external with the lingual cusp, descending from the point of the former, and in some instances is raised up into a conspicuous edge, but this is very variable. The crown of this tooth is rather round in sections, being widest in the region of the marginal ridges and tapering rapidly toward the neck, thus giving the contour of the crown a decided bell-shape. The buccal face curves over toward the lingual side, so that the outer cusp is directly over the central axis of the tooth. This tooth bears a close resemblance to the lower premolar of the insectivora in that the external cusp is the one conspicuous prominence, and the inner tubercle is much reduced. It is therefore essentially a primitive unicuspid premolar, as the lower premolars often are in the lower forms. It graduates from the canine, and is the tooth that properly occurred next to the canine in that archetypal mammalian dentition which was graded from tooth to tooth in regular continuity.

The second lower human bicuspid resembles the first somewhat in the bell-shape of the lower portion of the crown, as it is widest at the marginal ridges, is rather circular in outline at that location, and tapers rapidly toward the neck. But it differs widely from the first in regard to the features of the grinding face, and also from the upper bicuspids in that it has three cusps in its true typal form, and is essentially a tricuspid. It has one large, rounded cusp on the buccal edge, and two smaller, sharper cusps on the lingual edge of the marginal circle. The latter may be of equal size, or the mesial one may be considerably developed at the expense of the distal, but even when enlarged so as to make the tooth appear bicuspid in form the distal cusp is still present, even though it be a mere tubercle on the distal marginal ridge. The third cusp may be called a posterior cingulum, but deserves consideration as a cusp.

The tricuspid form of the second lower bicuspid is of course a reproduction of the tricuspid premolar of some lower species, although the triangular form of the crown is lost. It is different from the lower premolar in these forms also, in that these teeth are usually compressed and narrow and formed to strike against the internal ledge or tubercle of the upper premolars. The internal cusps of the lower bicuspids are probably a development of the internal talon of lower forms, which was developed to grasp the inner tubercle of the upper premolar.

As the typical second lower bicuspid is properly a tricuspid tooth, in dental prosthesis this form should always be followed in the artificial restoration of this tooth; so with the first lower bicuspid, which is typically unicuspid with an internal cingulum, which form should be followed in prosthesis. The bicuspid form of the lower bicuspids, as sometimes seen in man, is accidental and not typical, but this form is usually followed in restoring these teeth. The lower bicuspids are too frequently made just like the upper, even in the artificial teeth furnished to us. This is anatomically wrong and inartistic, and occasions much of the difficulty experienced in the articulation of the bicuspids. Therefore the first lower bicuspid should always be of typical unicuspid shape, and the second of tricuspid, that the anatomical forms may be properly reproduced and the artistic and mechanical requirements be better fulfilled in practice.

The importance of the study of the bicuspids consists in their prominent position in the arch, being placed between the cutting and prehensile teeth and the grinders. Their office is essential to the proper performance of the function of mastication, as well as their value to the esthetics of the mouth ; therefore any contribution to the knowledge of these valuable members of the dental arch needs no apology.

Dr. C. L. Goddard, San Francisco, said that Dr. Thompson's presentation was so full that there was little to discuss. It would be better if we had large drawings, so that all could see, but in the absence of these he had brought with him a copy of Owens's "Odontography." The bicuspid molar is sometimes met with in man. He himself has an example in his possession. The typical form of the premolars is best seen in the cat and hyena. In the herbivora they are more nearly like the true molars. In the horse, for example, they are sometimes called molars. Dr. Thompson only mentions three premolars, but in the typal dentitions of some orders there are four. The three-rooted bicuspid is occasionally found in man. The speaker had extracted one some years ago. Dr. Thompson classes the lemurs among the quadrumana. Others place them in another order, the prosimiæ. The terms bicuspid and premolar are sometimes used interchangeably, but it is not correct usage. A bicuspid is a premolar, but a premolar is not always a bicuspid. The term canine as used in the paper is not so good a word as cuspid. All the teeth intended to be described by the term are not canine, but they are cuspid, and it is unfortunate that the correct term is not more used by comparative anatomists, more especially as it would make the nomenclature of these teeth uniform : cuspid, bicuspid, tricuspid, etc. No doubt the Academy of Sciences, in whose hall we are meeting, will have skulls in its collection showing the points referred to in the paper, and it would be well for all who are interested to examine them.

Dr. George H. Chance, Portland, agrees with Dr. Goddard as to the use of the word canine to indicate the cuspid teeth being unfortunate. These are not canine in the monkey or in man, but they are cuspid always. He also objects to the use of the term fangs, which is so frequently employed to designate the roots of teeth.

The subject was then passed, and Dr. Merriman's paper on "Loop-Fillings" was re-opened for discussion.

Dr. Warren De Crow, San José, had felt that there was something lacking in the presentation of the subject by Dr. Merriman. It is hard to follow the reading of the details of a new method of practice when one cannot see diagrams or examples of the work being described. If Dr. Merriman had had diagrams illustrating the various steps in his method, it would have been better understood, and those who heard it would have been better prepared to discuss it. For himself, he must say that he had hardly grasped the *modus operandi*, and he thought it would be well to have such an illustration, either by clinic or otherwise, as would make the method clear. So far as he caught the idea he thought it a good one, but would like to see it clearly demonstrated.

Dr. A. F. Merriman, Jr., in reply, promised to demonstrate the "loop-filling" at the clinic at 10.30 o'clock Thursday morning.

Dr. Younger invited the members of the congress to lunch with him at 12 o'clock noon of the next day.

Dr. W. F. Lewis moved the appointment of a committee on resolutions, to report later. So ordered.

Dr. W. G. A. Bonwill, Philadelphia, being called for, said that he had come here to see what others were doing. For forty years he has been trying to teach men the best ways he knew, but before he can say anything he wants to know what others are doing, to see whether they need any help from him. We are entering upon a new era in dentistry. He had come to read a paper before the congress, if there was time to hear it; he would also like to talk about the articulation of the teeth, but it would require at least an hour to show the diagrams. Unless those to whom this subject was explained should see it as he did, they could not understand it. Few men have gotten hold of it, because they do not take the time to study it understandingly, but a few have understood it, and have felt the benefit of the knowledge. It is simply a method to do away with so much bridging and so much mutilation of human teeth. Unfortunately, some mutilation of the teeth is necessary, but much that is done in the name of dentistry is illegitimate, and it is the correction of these evils that the new era will see. Too many men waste too much time on their operations,—he does not. He has been asked what sort of foil he used, as if the rapidity of his operations was in the gold. If he can get a proper tooth for the purpose, he will demonstrate rapid operations at the clinic. Filling a tooth can as well be done rapidly as slowly. Many operators make the mistake of using serrated points in impacting gold. They should never be used.

Dr. J. C. McCoy, Santa Ana, Cal., read a brief paper, entitled "How to Induce Our Children to Cleanse their Teeth." The plan, he said, had been suggested to him by Dr. G. R. Thomas, of Pasadena. The first thing is to supply the children with the necessary appurtenances,—a brush, medium in size and stiffness, a pleasantly-flavored tooth-powder in a wide-mouthed bottle, so that the brush can be dipped into it, a safe and convenient place to keep them, and last but not least, plenty of water, the free use of which he encourages. The child is taught the use of the brush as soon as the temporary teeth erupt, and if the parent is faithful the child will take the care of its teeth into its own hands at four years. To induce his boys to clean their teeth regularly, he offers a reward of one cent for each time, and requires them to clean the teeth three times a day: first, when hands and face are washed on rising in the morning, then after the noon meal, and before retiring, with an additional ten cents at the end of the month if faithful; if neglectful, they forfeit one cent for each time. A sheet of paper is tacked up on the wall divided into thirty spaces, with pencil hanging conveniently, so that the boys can mark each time they clean their teeth. The account is balanced carefully at the end of the month, paid promptly, and the boys do what they please with the money. Dr. McCoy said his experience with this plan had been most encouraging.

Dr. W. F. Lewis, Oakland, has a different method, which is quite as positive and successful as Dr. McCoy's. He lays down the rule that no child shall come to the breakfast table until its teeth are cleaned, and that rule is like the laws of the Medes and Persians. He has found by impressing on the children the necessity of keeping their teeth clean, that when they are grown it has become such a habit that they do not care to do without clean teeth. The habit can be taught to a very young child.

Dr. Chance. We can be great in little as well as in great things. It is the little things that make up our daily lives. His way of teaching children the need of clean teeth is like Dr. Lewis's. He does not believe in paying people to do right; it is too much like betting on the result. Brushing the teeth means a great deal to dentists. We want to save the teeth of the babies of the poor as well as of the rich; to put in just as good fillings for them when needed. If, when a child is in your chair, you will clean its teeth carefully and then show it how pretty they look, it will help to make that child want its teeth kept clean. How to brush the teeth is as important as the brushing itself. A good many tooth-scrubbers don't clean the teeth, and a great deal of attrition is caused by improper brushing. In many cases, you can tell whether a person is right- or left-handed by examining the marks left by brushing the teeth. [Dr. Chance here demonstrated the proper method, in his opinion, to brush the teeth,—that is, the upper teeth downward from gum-margin to incising or grinding surface, the lowers in the opposite way.] He would brush before breakfast, because the mouth doesn't taste well without it; but he would also teach the children to brush after breakfast, dinner, and supper, and before going to bed.

The subject was passed.

Dr. Merriman then illustrated on the blackboard some points in "loop-filling." In reply to questions, he stated that he had never had any pulp-trouble from the use of the cement. Sometimes he uses a little iodoform in the cavity. He prefers to carry the loop across the cavity in most cases.

Adjourned to 7.30 P.M.

Evening Session.

The congress was called to order at 8.20 P.M., President Younger in the chair.

A paper by Dr. H. A. Fynn, of Denver, on "Chloroform-Anesthesia," was read. An abstract follows:

In the writer's estimation, chloroform is the greatest anesthetic, and where everything is favorable for its administration, in the hands of a careful operator, it is absolutely safe. Where its administration is contraindicated, no anesthetic is safe. This being true, it follows that fatal results are not dependent on the agent, but on the physical condition of the patient, or mistakes arising from ignorance or carelessness in its administration.

In administering, the patient should be as nearly as possible in a recumbent position, though this is not necessary except where the patient is anemic or suffering from weakened heart-action, in which case every precaution is necessary. The apparatus should be as simple as possible, as an ordinary paper cone with free opening in the smaller end, in which is a sponge or napkin to be saturated with the chloroform. Inhalations should at first be very much diluted with atmospheric air. A strength exceeding one per cent. merges on dangerous ground. This should be gradually increased till it reaches a strength of four or five per cent., when complete anesthesia will soon be produced. Anemic patients should always be placed in a horizontal position, and all constriction that would in any way impede the flow of blood through the venous system, particularly about the neck, waist, and lower extremities, should be removed, the heart's action should be carefully watched, and at the first sign of danger the patient must be restored to consciousness. If an anesthetic is given at all, complete insensibility should be produced. It should be given fearlessly, but not hurriedly, bearing in mind that anesthesia is a change from a physiological to a pathological condition, produced by shutting out the atmospheric air and deoxygenating the blood and tissues.

Dangerous symptoms in chloroform-anesthesia are almost universally manifested in the heart's action, and arise from direct paralysis or the anesthetization of the nerve-centers upon which the action of the normal heart is dependent, especially the pneumogastric. One of the most effective means of accomplishing resuscitation is the complete inversion of the patient. Artificial respiration is also beneficial, and the injection of one-sixth to one-fourth of a grain of morphin is an excellent arterial stimulant. Brandy or whisky can also be used, either by injection or ingestion. After the patient commences to breathe, nitrite of amyl can be inhaled, and is a good stimulant. It is necessary in such circumstances to continually bear in mind that the blood has been deoxygenated, and until it is reoxygenated the patient will not recover.

Cases in which chloroform cannot be administered are exceptional. An examination is, however, absolutely necessary, so that one may know from what source to expect danger. It has been proved beyond doubt that shock and the fear of a capital operation are more injurious, especially in cases of heart-disease, than the administration of chloroform. The action of the kidneys as manifested in the urine has lately received a great deal of attention, as showing whether the resisting power of the patient is below the normal standard. According to Dr. W. H. Porter, "If the urea is markedly decreased or the quantity of uric acid is perceptibly increased in quantity, alone or with the presence of other by-products of incomplete proteid oxidation, such as lactic acid and oxalic acid, bile-salts, and pigments, it indicates imperfect oxidation, impaired nutritive activity, and decreased vitality." Under such conditions, the administration of an anesthetic and performance of the operation should be postponed. For the same reason, special care is necessary in administering to patients suffering from chronic diseases of long standing, as tuberculosis, syphilis, or any of the various kidney-diseases ; also in very old people, on account of lowered vitality and weakened recuperative powers.

The superiority of chloroform lies in the comparatively small quantity required, eighteen minims actually inhaled being the average dose ; less liability to nausea, pleasanter to patients, absolute certainty of results, less struggling and muscular excitement, patients being always under control, and particularly happy in its effect on little children.

To sum up, chloroform should be given freely, but always carefully ; always pure and never mixed with other anesthetics ; only after careful examination of the patient, to know from what source to anticipate danger. With these precautions satisfaction is almost assured.

Dr. E. L. Townsend, Los Angeles, in opening the discussion, said that Dr. Fynn starts with the assumption that chloroform is the greatest of anesthetics, but he adduces no argument to prove it, and states when all is favorable, and the case is in the hands of a careful operator, it is absolutely safe. Dr Townsend feels that this gives too much prominence to the personal equation, a factor which is too often brought forward in papers read before associations ; for what one man may do, another can do equally well. It is safe to say that no man is greatly superior to his colleagues and to his immediate surroundings. The speaker therefore prefers to eliminate the personal element, and let chloroform stand on its record, which is at the head of the list as an exterminator of patients. Dr. Fynn admits that the vulnerable point in his argument is the impossibility of telling beforehand who can and who cannot take chloroform without risk. It therefore behooves us to exercise our own judgment in choosing an anesthetic, and give the patient the benefit of the least danger. Dr. Townsend then quoted from Turnbull to prove that chloroform kills so suddenly, when it does kill, that no skill and no care can always guard against a fatal result. If this is so, then the dentist must be ignorant or stubborn who will use chloroform for such minor operations as come within his sphere, and the law will hold him responsible. With reference to Dr. Fynn's statement of symptoms, the arrest of the heart's action is a phenomenon of excitation, and not of paralysis or paresis, in four out of five cases. He wished to emphasize the statement that no anesthetic is absolutely safe, and chloroform is no exception to the rule. It is all right to administer anesthetics to healthy persons, but the sickly or delicate are not fit subjects for general anesthetics.

Dr. J. L. Asay, San José The question of anesthesia has been for many years the subject of great discussion, and it is still a complex question in the minds of many. Some prefer chloroform, others ether, still others nitrous oxid. Perhaps none of those present have had better opportunities for observing chloroform than the speaker, as he has administered it thousands of times. Having been four years in the army medical service, he thinks he is fully conversant with the method in which it should be used. The great mistake is in forcing it upon the patient. In the army it was inhaled drop by drop, and when the breathing became stertorous the surgeon was ready to operate. That was the surgical way of using chloroform. But in dentistry its aid is to be called in only to tide the patient over while a tooth or teeth are extracted, and the narcosis need not be so complete. The principle put forth in the paper is this, simply to tide the patient over a few minutes' painful work. He would not under any circumstances give chloroform to a person with an irregular pulse or with any other organic trouble. It is dangerous when there is any tubercular form of disease present, because in such cases there is always disturbance of the heart's action, and chloroform sets up such a commotion as to kill the patient in spite of every care. Life goes on as long as the heart pulsates. In one case the heart ceased to beat at the second inhalation. In the army, the first or second inhalations were regarded the most dangerous. In the restoration of patients, in case of complications in the administration of chloroform, great reliance is placed on the recumbent position and artificial respiration. You can't get a man to drink whisky when he is in a recumbent position ; you can force it down him. The main reliance is artificial respiration. You must get the oxygen back into the blood again, and this is one of the most effective measures.

Dr. Chance indorses generally the statements of the paper. He has given chloroform largely, and has done it knowing that the medical profession would not indorse his action. He has given nitrous oxid thousands of times, has given ether, and A, C, E. You never heard of a death from chloroform except at the time of the operation ; but you have heard of death from nitrous oxid after the operation was over, of death from ether after the patient recovered from the anesthesia. He had never given chloroform that he wasn't afraid of an accident, and that is why he never has an accident. There are three stages of chloroform-anesthesia : the first is relaxation, the second rigidity, and then comes the full narcosis. You must know beforehand, of course, that the patient is in condition to take the anesthetic. After a few years of experience this knowledge becomes almost intuitive. If you get the patient's confidence and then avoid shock,—it is shock which kills in nine out of ten cases,—there is little danger. In administering chloroform, the way used to be to overwhelm with the vapor. You might just as well put the patient under twenty feet of water. The better way is to have the patient follow Dr. Bonwill's idea of rapid breathing at the start, then allow him to inhale a few drops of chloroform, telling him to hold up the hand ; when the hand falls, go ahead and take out the tooth, but never more than one at a time.

Dr. Max Sichel, San Francisco, has not used so much chloroform of late years, preferring Billroth's method with alcohol, chloroform, and ether.

Dr. Bonwill said that the subject was interesting to him,—not so much because he cared especially about the anesthetics of the day, for in twenty years he had not used an anesthetic in his office, nor does he send his patients to others for the purpose. You have no doubt heard of rapid respiration. That this expedient would procure immunity from pain was hardly believed to be possible ; the idea had been ridiculed and its author laughed at, but still it is recognized by the authorities. Brown-Sequard said he knew it was a fact. Every week sees some manifestation of its truth. It is not surprising that dentists should laugh at it and decline to stop using nitrous oxid, for administering which they can get good prices. Rapid breathing produces an analgesic state, where the sense of touch remains intact, but the patient is insensible to pain, and perfectly conscious of what he is doing and what is being done to him. When it is necessary to induce this state, as for the extraction of a tooth, you have only to make the patient breathe rapidly for a little while and you may go ahead with the extraction without hurting. While he admires the spirit which claims that chloroform is as safe as any other anesthetic, the fact remains that the great majority of authorities have acknowledged that it is not the safest, and he thinks dentists should not use it. The stage of analgesia is always safe. The author of the paper shows that the admission of air has a good deal to do with the safety he claims. In rapid respiration, one hundred to the minute (the method of which Dr. Bonwill here demonstrated), he has had patients to claim they were paralyzed to the elbows. When he first tried chloroform, he saw the analgesia produced in the earlier stage ; then he tried electricity by reversing the current from the centers to the periphery, and it relieved pain, giving a greater effect than the other. While operating with electricity he accidentally hurt a patient, and the involuntary deep inspiration which it caused carried his mind back to his boyhood days when he pinched his finger and involuntarily stuck it into his mouth and drew in his breath hard, and the thought of Nature's anesthetic—rapid breathing—dawned upon him. He does not use rapid respirations in all his operations on sensitive dentine, but directs the patients to inspire deeply, and as they draw in the air he follows with the instrument. What effect has this rapid breathing upon the blood? It simply takes out the carbon. When the patient is breathing normally and the heart beating seventy to the minute, going from twenty to one hundred inspirations in a minute and a quarter does not increase the heart-pulsations; at least the increase is hardly perceptible. It is not over-oxygenating the blood, but it is setting free five times as much carbon dioxid. The best evidence that patients are not hurt is that when it is over they say it must have hurt because they knew what was being done all the time. This method of inducing freedom from pain is a perfectly physiological and normal act. For himself, he does not often extract teeth. If he was a professor in a dental college he would make the students save teeth, or he would let them go as not fitted for the practice of dentistry. Think of the thousands of mouths that are a disgrace to us as dentists.

The subject was passed.

(To be continued.)

UNION MEETING OF THE MARYLAND STATE DENTAL ASSOCIATION AND THE WASHINGTON CITY DENTAL SOCIETY.

(Concluded from page 574.)

SECOND DAY—*Evening Session.*

THE convention was called to order at 6.30 P.M., Dr. B. Holly Smith in the chair.

Papers upon the subject of dental legislation were read by Dr. Emory A. Bryant and by Dr. Williams Donnally, of which the demands upon our space permit only a brief abstract.

Dr. Bryant, after a forcible presentation of the impediments in the way of uniform legislation among the states with respect to dental practice, offered a plan which was presented in the form of an outline of an enactment intended for general adoption, in which the central idea was the appointment of a reputable practitioner in each state to be a commissioner of dentistry, and to be appointed by the proper state authority, the commissioner to have power to pass upon the diplomas of candidates and decide upon their reputability. Relief from the findings of the commissioner to be had through equity proceedings in the courts when unfair or unjust action was charged by the candidate. Only graduates of colleges, or those holding certificates of registration, to be eligible for registration under the proposed act, which further provides for the revocation of licenses for cruelty, misdemeanor, incompetency, unprofessional conduct, etc., with relief by mandamus proceedings to the practitioner who has for any of these causes lost his license.

The proposed act contains suitable provisions for the defraying of expenses attendant upon its administration, and for the interstate recognition of licensees by virtue of their having the proposed uniform legislation.

Dr. Donnally's paper alluded to the great motive forces which had furnished the impetus to professional progress, and which are the foundations of the present status of dentistry,—viz, legislation, dental organizations, the colleges, and dental literature. While he proposed to deal only with legislation as one of the essential features of the problem with which the young practitioner is concerned, he did not wish to be understood as magnifying the importance of it above the others, as all were interdependent and complementary, each essential to the other and to the whole. He claimed recognition for the fact that in all dental legislation for the regulation of the practice of dentistry the people were the beneficiaries primarily, the secondary resultant being the stimulus to dental educational methods whereby the standards are raised and the character of the educational product is improved.

These results are achieved independently of the fact of the wide divergences in the dental legislation of the several states ; for no matter to what extent they may differ in details, they have avowedly the same common object as stated.

He regards, and justly so, the chief obstacle in securing uniform dental legislation for the several states as due to the difficulty in establishing a uniform educational standard for all the states.

"Other features are but the machinery of the law, and are not essential principles about which we would be justified in disagreeing."

That a uniform standard has not been attained has not been due to want of harmony of aim, but to lack of concerted action.

He feels that it may be confidently expected that the National Association of Dental Examiners will in time formulate a plan which will lead to the unification of the essential features of all the state laws. The previous efforts of the National Examiners' Association and of the American and Southern Dental Associations toward this end emphasize the demand of the profession for unity of action in this regard.

"No one taking the pains to inform himself as to the current of thought running through our journals the past ten years will fail to see that it is the able and experienced teachers and examiners who hold the strongest convictions regarding the necessity for restrictive legislation and function of the examining board, and it is only the superficial thinkers, or such as have had unsatisfactory personal experience with examining boards, who would have us cast away this wholesome restraint upon the disreputable colleges and incompetent would-be practitioners."

Discussion.

Dr. S. C. G. Watkins said the subject was one of great importance at the present time, and receiving thought from active men all through the profession. At the meeting of the New Jersey State Dental Association this summer they were going to have as many representatives of the state boards as they could, and they would discuss the subject of legislation with the view of making an effort for a uniform law. Then when the National Board of Dental Examiners meets at Old Point Comfort, possibly they may be able to draft a law that will be acceptable to all the states. They had already responses from quite a number who have promised to be with them.

Dr. Chas. A. Meeker said at the same annual meeting of the officers of the New Jersey State Society, held January 6, a plan was outlined to have the state boards as far as possible meet and discuss the matter and determine what would be desirable in a law which would be acceptable in all the states. At present no two states have exactly the same provisions. He spoke favorably of the working of the New Jersey law.

Dr. C. L. Goddard thought that for the state boards to examine all who wished to enter the practice of dentistry, even if they were graduates of colleges, was the surest way to keep up the standards of the college. The effect of such examination would not be to work a hardship on graduates of reputable colleges, because all such graduates should be able to pass the examination, which should be held soon after the time of the commencements in the colleges, and a certificate from the examining board of any state should entitle the holder to practice in any other state. To make the examinations as uniform as possible it would be well to have, say, one hundred questions in each branch of the studies prepared by a body consisting of delegates from all the states, and these questions be used by all in their examinations. Having so many questions in each branch would remove the possibility of any candidate specially cramming for the examination, even if by any means the questions should come into his hands, because as not more than ten questions would be asked in any branch, and he could not know beforehand what ten would come to him, the only way would be for him to post himself on the whole hundred, which would probably be a fair education.

Dr. F. C. Barlow said that the questions formerly used at the New Jersey examinations had been copied, and students had prepared themselves on them, but now they used a different set of questions each examination.

Dr. L. Ashley Faught spoke in favor of the board examining all candidates. In Pennsylvania at present the examining board has nothing to do, but at the next annual meeting we may have such a regulation introduced as will require the examination of all who wish to practice.

Dr. Sweeney said the one point he wished to show in his paper was that there was a universal complaint that the laws all favored dentists already in practice, and were hard on those who wanted to begin practice or to go from one state to another. There will be, there must be, a change in these respects. He further held that a diploma from a reputable dental college should entitle one to practice without further examination.

Dr. Donnally, in closing the discussion, called attention to the proposition for action on procuring uniform dental laws, at the coming meetings of the American Dental Association and the Southern Dental Association, and hoped the movement would be successful. The fact that dental legislation was not called for outside of the profession did not prove that it was not for the advantage and protection of the people, any more than that sanitary and quarantine laws were proved to be of no benefit or protection to the people because they were called for by plumbers and physicians. The work of examining boards had been found of the greatest advantage. Even the colleges and nearly all who teach in them agree upon this.

Discussion closed, and convention adjourned to the banquet, which was held at Freund's Hall.

MISSISSIPPI STATE DENTAL ASSOCIATION.

AT the twentieth annual meeting of the Mississippi State Dental Association, held in Natchez, May 1, 2, 3, 1894, the charter obtained for that body, by a committee appointed at the last annual meeting, having been granted in the name of the "Mississippi Dental Association" (the word *State* having been inadvertently omitted), it became necessary to dissolve the old association, and to reorganize under the new name. This was accordingly done, the charter being accepted, a revised constitution and by-laws adopted, and the following officers elected: Dr. W. E. Walker, Pass Christian, president; Dr. F. H. Smith, Water Valley, vice-president; Dr. T C. West, Natchez, secretary; Dr. C. C. Crowder, Kosciusko, treasurer.

The association adjourned to meet in Jackson, on the Wednesday following the first Tuesday in April, 1895.

The State Board of Dental Examiners having resigned in a body, the governor of the state appointed a new board, which organized May 15, as follows: Dr. D. B. McHenry, Grenada, president; Dr. H. G. Nisbet, Aberdeen, secretary; Dr. J. B. Askew, Vicksburg; Dr. E. E. Spinks, Meridian; Dr. C. W. Robinson, Magnolia.

LEBANON VALLEY DENTAL SOCIETY.

AT the annual meeting of the Lebanon Valley Dental Society, held at Reading, Pa., May 16, 1894, the following officers were elected for the ensuing year: G. Hickman, Reading, president; P. S. Mogel, Reading, vice-president; H. J. Herbein, Pottsville, recording secretary; P. K. Filbert, Pottsville, corresponding secretary; C. B. Wagner, Lebanon, treasurer. The executive committee is composed of C. V. Kratzer, Reading; E. P. Kremer, Lebanon; and H. W. Bohn, Reading.

Lititz was selected as the place of meeting for next year.

NORTH DAKOTA DENTAL ASSOCIATION.

THE twelfth annual meeting of the North Dakota State Dental Society was held at Grand Forks, June 20, 21, and 22, 1894.

The following officers were elected for the ensuing year: Dr. E. M. Pierce, Hillsboro, president; Dr. R. B. Foster, Grand Forks, vice-president; Dr. C. L. Rose, Fargo, secretary; Dr. D. B. McLain, Jamestown, treasurer.

Next meeting to be held at Fargo, May, 1895.

C. L. ROSE, *Secretary*, Fargo.

MISSOURI STATE DENTAL ASSOCIATION.

AT the thirtieth annual meeting of the Missouri State Dental Association, held at Excelsior Springs, July 10 to 13, 1894, the following officers for the ensuing year were elected: Dr. J. T. Fry, Moberly, president; Dr. D. F. Orr, Liberty, first vice-president; Dr. W. L. Reed, Mexico, second vice-president; Dr. W. M. Carter, Sedalia, corresponding secretary; Dr. S. C. A. Ruby, Clinton, recording secretary; Dr. James A. Price, Savannah, treasurer; Dr. James A. Price, Savannah, committee on law.

The next meeting will be held at Bertle Springs, beginning on the first Tuesday after the Fourth of July, 1895, and continuing in session four days. W. M. CARTER, *Corresponding Secretary.*

ALUMNI SOCIETY, UNIVERSITY OF PENNSYLVANIA.

THE fourteenth annual meeting of the Society of the Alumni, Department of Dentistry, University of Pennsylvania, was held at Colonnade Hotel, Philadelphia, the afternoon of June 6, 1894; Dr. S. Freeman, of New York city, presiding.

Members were present from New York, New Jersey, Delaware, Massachusetts, and Connecticut, as well as from the interior of this state. These, with the members residing in the city, numbered thirty-five.

Dr. Edward H. Allen, Freeport, Ill., presented a paper, which was read by Dr. H. B. McFadden, of Philadelphia, Pa., entitled "To What Degree should a Dentist be Conservative?"

Dr. A. H. Porter gave a *résumé* of a most interesting as well as original paper on "The Physiology of Hypnotism."

These papers, together with the proceedings of the meeting, will be printed in the "Alumni Annual," which is published by the society, and will be issued the first of the year.

The officers elected for the ensuing year are W. L. Winner, president; F. A. Peeso and A. H. Porter, vice-presidents; J. Edward Dunwoody, recording secretary and treasurer; Geo. C. Kusel, corresponding secretary; H. B. McFadden and George T. Cornelius, members of executive committee,—all residing in Philadelphia.

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DENTAL COLLEGE COMMENCEMENTS.

UNIVERSITY OF MICHIGAN—COLLEGE OF DENTAL SURGERY.

THE fiftieth annual commencement exercises of the University of Michigan were held in Ann Arbor, Mich., on Thursday, June 28, 1894.

The commencement oration was delivered by George Herbert Palmer, A.M.

The number of matriculates in the College of Dental Surgery was one hundred and seventy-six.

The degree of D.D.S. was conferred on the following graduates:

Della C. O. Adams.
Frank P. Adams.
Charles F. Amsden.
Otto Anderson.
Adelbert H. Babcock.
Edwin I. Backus.
Andrew S. Bailey, B.S., *Lawrence University.*
Roy E. Bailey.
Robert E. Davies.
Frank B. Dawley.
James K. Douglas.
William B. Elster.
Edward L. Gedney.
William E. Goucher.
Myron P. Green.
Harry L. Griswold.
Alfred W. Hall.
William A. Hart.
Garrett S. Hartley.
Charles P. Haselden.
George E Hathaway.
William J. Higgins.
John L. Hoover.
Homer F. Hussey, Ph.B., *Earlham College.*
George R. Johnson.
George W. Kenson.
Allen H. Kessler.
Joseph Lathrop, Jr.
Charles C. Lick.
Mary Linde.
Robert B. Mackenzie.
Fred W. Blake.
Henry M. Bridgman.
Damon I. Butler.
Thomas S. Buzzard.
Anthony J. Casey.
Charles D. Cassidy.
Frederick H. Codding.
Estus H. Coller.
Gerald W. Collins.
Michael J. McCormick.
Chas. A. McGettigan, Jr.
James A. McIndoe.
Walter C. McKinney.
Anna K. Miller.
Charles L. Mitchell.
Albert F. Monroe.
George McW. Moore.
Miles J. Moyer.
Allen E. Mulder.
Forest J. Overholt.
Barnum H. Pearce.
Benjamin F. Pearce.
George A. Servis.
Frank L. Stow.
Harvey A. Sturdevant.
Dean N. Swift.
Charles H. Terry.
Charles R. Vanderbelt.
Albert W. Weible.
Charles T. Whinery.
Walter M. Wilkins.
Wallace V. Wolvin.
George P. Wurster.

BOSTON DENTAL COLLEGE.

THE twenty-seventh annual commencement exercises of the Boston Dental College were held in Berkeley Temple, Boston, Mass., on Wednesday, June 20, 1894, at 7.30 P.M.

The annual address was delivered by Rev. E. Winchester Donald, D.D.

The number of matriculates for the session was one hundred and fifty-two.

The degree of D.D.S. was conferred on the following graduates by I. J. Wetherbee, D.D.S., president of the college:

NAME.	STATE OR COUNTRY.	NAME.	STATE OR COUNTRY.
B. DeF. Barton	New Brunswick.	Harry P. Jones	Massachusetts.
Harry G. Beekman	Massachusetts.	Walter E. Knapp	Massachusetts.
Frank R. Chapman	Massachusetts.	George L. Mason	New Hampshire.
Harry P. Chase	New Hampshire.	Chas. A. McGinley	Massachusetts.
Peter A. Caulfield	Massachusetts.	Daniel A. Nason	Massachusetts.
Charles H. Davis	Rhode Island.	Wm. F. B. Reilley	New Hampshire.
Carroll A. Egan	Massachusetts.	Wm. L. Rombough	Massachusetts.
Henry M. Egan	Massachusetts.	Louis W. Scott	Prov. of Quebec.
Walter E. Farris	Massachusetts.	Wyman H. Streeter	Massachusetts.
Homere G. Fauteux	Prov. of Quebec.	Lucius K. Thayer	Massachusetts.
James J. Ford	Massachusetts.	Jos. L F. Taylor	Maine.
Harry C. Gleason	Maine.	John B. Tufts	Massachusetts.
John E. Glidden	New Hampshire.	Albert H. Ward	Massachusetts.
Arthur W. Gould	Massachusetts.	Fred G. Weeks	Maine.
William T. Hill	Massachusetts.	William J. Welch	Massachusetts.
William R. Howard	Massachusetts.	Cyrus R. Wetherell	Massachusetts.
John H. Jackson	Washington.		

UNIVERSITY OF CALIFORNIA—COLLEGE OF DENTISTRY.

THE commencement exercises of the College of Dentistry of the University of California were held at Odd Fellows' Hall, San Francisco, Cal., on Thursday, June 14, 1894, at 8 o'clock P.M.

The number of matriculates for the session was one hundred and forty-two.

The faculty address was delivered by Joseph D. Hodgen, D.D.S., and the degree of D.D.S. was conferred on the following graduates by Martin Kellogg, A.M., president of the university :

Edward E. Baird.
William H. Cavell.
McCoy Chappell.
Conrad Deichmiller.
John A. Gibbon.
Gilbert F. Graham.
Robert F. Gray.
Walter S. Jewell.
James W. Likens.
William O'Rourke.
Henry Powell, Jr.
Walter J. Taylor.
L. Van Orden, Jr., M.D.
Thomas A. Vogel.
David J. Vogelman.
William H. Wadsworth.
Walter I. Wilcox.
Charles C. Wood.

DENTAL SOCIETY ANNOUNCEMENTS.

AMERICAN DENTAL ASSOCIATION.

A REDUCTION of one and one-third fare, on the certificate plan, has been secured from all the railroad associations except the Western Passenger Association, on condition that one hundred or more are in attendance. In order to get this reduction, a certificate must be taken from the agent at starting-point, which entitles the holder to one-third usual fare on return ticket.

These tickets can be gotten three days before the date of meeting, August 3, and are good three days after close,—August 11. Hotel rates at Hygeia Hotel, $2.50 per day. J. N. CROUSE.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE National Association of Dental Examiners will hold its annual meeting at the Hygeia Hotel, Old Point Comfort, Va., at 10 o'clock A.M., August 7, 1894.

It is earnestly hoped that each state board will be represented by one or more delegates. J. SEARLE HURLBUT, *President*,
Springfield, Mass.

NORTHERN ILLINOIS DENTAL SOCIETY.

THIS society meets on Wednesday and Thursday, October 17 and 18, 1894, in Aurora. All dentists in Northern Illinois are expected to be there. A good program is in process of preparation.

JAMES W. CORMANY, *Secretary*,
Mt. Carroll, Ill.

FIRST DISTRICT DENTAL SOCIETY OF ILLINOIS.

THE First District Dental Society of Illinois will hold its annual meeting in Peoria, September 11 and 12, 1894.

A thoroughly practical program has been prepared, and the meeting will prove an instructive one to all who attend.

O. M. DAYMUDE, *President*, Monmouth, Ill.
W. O. BUTLER, *Secretary*, La Harpe, Ill.

EDITORIAL.

TWO ITEMS FOR CONSIDERATION.

AMONG the matters to be presented for discussion by the American Dental Association at its coming meeting at Old Point Comfort will be the proposed celebration of the fiftieth anniversary of the discovery of the anesthetic property of nitrous oxid by Horace Wells, of Hartford, Conn.

The idea of suitably recognizing this important event seems to have sprung spontaneously into existence in several quarters at about the same time, but so far as we can learn the first definite step toward it was taken by resolution of the Odontological Society of Pennsylvania, passed at its meeting of April 10, 1894, authorizing the appointment of a committee to take action in the premises and prepare a plan for suitably celebrating the event.

At the last annual meeting of the Connecticut State Dental Association, held in Hartford, May 15, 16, similar action was taken. Both of these efforts contemplated a purely local celebration in recognition of the importance of the discovery, with appropriate honors to its author.

The publication of the action of these societies brought the matter prominently before the dental profession, and the feeling has gained ground that to honor the memory of this benefactor of his race is a duty and privilege which extends, and of right belongs, to the whole dental profession of America, if not of the world. The idea of nationalizing the event, and so giving to the profession at large the opportunity to participate, was strongly urged by the editor of the *Dental Practitioner and Advertiser* in a recent issue. The suggestion there made has met with hearty approval on all sides. The majority of societies which have recently met have instructed their delegates to the American Dental Association to favor any plan that may be there agreed upon, and to co-operate in so carrying it out that the donor of this best gift of American dentistry to humanity may be adequately honored.

No argument is needed to emphasize the importance of making the proposed celebration a national one; it could appropriately be made international, but certainly anything less than a national event in this connection would be a discredit to us as a profession. It is a matter that should enlist the earnest, hearty support of every practitioner of dentistry. To celebrate the anniversary by a number of disconnected and desultory meetings would be to miss a great opportunity for achieving what should be the objective point of the effort,—viz, to secure a permanent memorial as a record of the event. By a concerted effort, if properly managed and officered, there need be no difficulty in making all necessary preparations in the comparatively limited time at command. While no suggestion as to the details for a plan has been made, it may be taken as a foregone conclusion that an essential feature of the program will be the reading of essays related to the subject of anesthesia. This phase of the celebration, if intelligently managed, can be made to furnish a record which of itself would be perhaps the most appropriate and fitting tribute that could be produced in honor of the discoverer of anesthesia.

To secure a satisfactory result of this character the committee in charge should formulate a definite plan with respect to the essays, and so select and arrange them that they shall be harmoniously related to one another and to the central idea of the meeting. A record of the papers would thus furnish a symposium which would not only possess intrinsic value as a most important contribution to the subject, but would be a tribute to the memory of Horace Wells in keeping with the spirit of the man. Such a plan cannot be successfully carried out unless the committee shall first carefully prepare a logically arranged scheme of the subjects to be presented, and then secure the co-operation of the best authorities in the several departments of the subject to write them up.

A feature of only secondary importance to the scientific phase of the program, and which should be elaborated as fully as possible, is the collection and exhibit of all the apparatus and appliances obtainable which have been and are used in connection with the anesthetic procedure.

As a tentative suggestion for the arrangement of so much of the program as is included within the lines here indicated, and for the purpose of helping to give the plan a logical form, the following scheme for the treatment of the subject is offered:

1. Historical and Biographical.
2. Relations of Anesthesia to and its Influence upon Surgical Methods and Procedures.
3. The Development of the Science and Art of Anesthesia.
4. Physiology of Anesthesia.
5. Papers upon Individual Anesthetic Agents and Methods, General and Local.
6. The Chemistry of Anesthetics, and the Relations of their Chemical Composition and Physical Properties to their Physiological Action.
7. Exhibit of Apparatus and Appliances for Production of Anesthesia.

The record of such a meeting embodying the latest thought in the principal departments of anesthesia, and issued as a souvenir volume, would be an honor to the discoverer of anesthesia more appropriate than any number of banquets with their post-prandial oratory, or even monuments or memorial tablets.

In our previous issue we called attention to the importance of the Midwinter Fair Dental Congress, which has just successfully concluded its work at San Francisco. From the fact that modern dentistry had its birth in the Eastern Coast states and its most active growth has been in the same locality, it has become a habit of mind of the eastern dentists to regard it as an exclusively eastern possession ; but the growth of dentistry westward has been surely and persistently advancing until the West has demonstrated in the most unequivocal manner that she has passed the period of simple studentship, and announces in no uncertain tones that she has something to teach her eastern colleagues. The importance of the work of western men in all departments of dentistry, its science, its art, and especially its educational methods, is a matter of record in our literature. We cannot afford to ignore this work, or to accord it less than a respectful hearing and due consideration. The invitation has been given more than once to the American Dental Association to meet in San Francisco. This invitation includes more than the spirit of hospitality which prompts it. It means an opportunity for dentists in all sections of this broad land to become acquainted with the best work of the profession in the West, and with the men who are doing it. In view of what this work has been up to date, as shown by the records, will it not be right, as well as good policy, to hold the next meeting of the American Dental Association in San Francisco?

DEATH FROM HEMORRHAGE AFTER TOOTH-EXTRACTION.

A CASE where death resulted from hemorrhage following extraction of a tooth is thus reported in the *Lancet* of June 2, 1894 :

> In the *Annals of Surgery*, Dr. Elliott Bates records a case which is interesting as showing the dangers to which patients suffering from hemophilia are exposed even under slight operations. The patient was a man aged twenty-five years, who had been delicate from childhood, suffering at intervals from painful joints and digestive troubles. On one occasion, in childhood, a slight accident resulted in profuse hemorrhage, and twice he nearly lost his life on account of hemorrhage after extraction of a tooth. He determined, however, to risk it a third time. Gas was administered and the tooth removed. Hemorrhage followed, but diminished steadily after the cavity had been packed. It returned, however, during the night, and in the morning the patient was in a state of collapse from loss of blood, the face and lips being pale and cold, while he also had tinnitus aurium and dimmed vision. In spite of treatment by hypodermic injections of whisky, strychnia, and saline

solution, the patient continued to lose blood, and gradually became weaker, finally succumbing seventy-six hours after the extraction of the tooth. There was no trace of any similar condition to be discovered among the patient's relations. On the maternal side there was a phthisical taint, and on the father's a neurotic tendency.

We have not had access to the original record in the *Annals of Surgery*, and are therefore without information as to what measures were adopted for the arrest of the hemorrhage. From the account which is given in the *Lancet*, it does not appear that anything further than packing of the socket was done in the matter of local treatment. Stimulating and supporting medication was resorted to, during which time and until death closed the scene the hemorrhage continued. From the evidence before us, the cause of death in this case would seem to be the ignorance or incompetency of those in charge of it. Why, even in cases of hemophilia, a patient's life should be allowed to ebb away because of the inability of those in charge to arrest so small a leak as is involved in extraction of a tooth, is past comprehension. What is needed is a little more of the common sense that is in such emergencies too uncommon. It does seem pitiable that a problem which would be trivial for an ordinary plumber should present fatal difficulties to a trained surgeon. It is stated that "the hemorrhage steadily diminished after the cavity had been packed." Why was it not packed so that the hemorrhage was arrested at once? Why pack it at all if the packing did not arrest the flow of blood? Why not plug the cavity with something that will perfectly close it? The problem is simply that of plugging up the hole out of which the blood flows. If this cannot be done with styptic, non-absorbent cotton held in position with a compress and head-bandage, then a plug of plaster of Paris or of oxyphosphate of zinc pressed by the ball of the thumb into the socket just at the moment setting of the mass is taking place will, as is well known, effectually stop the flow. Or, what better-fitting plug can be found than the extracted tooth? Dip its roots in tannin or powdered alum, and press it back to place. Afterward it can be removed when all danger of hemorrhage is past; or, if necessary, it might be allowed to remain, on the principle that a live man with a bad tooth is better than a dead one without teeth.

DEATH OF DR. R. B. WINDER.

As this issue goes to press, the sad intelligence of the death of Professor Richard B. Winder, Dean of the Baltimore College of Dental Surgery, reaches us. An extended notice of Professor Winder will appear in our next issue.

BIBLIOGRAPHICAL.

AN ILLUSTRATED DICTIONARY OF MEDICINE, BIOLOGY, AND ALLIED SCIENCES. Including the Pronunciation, Accentuation, Derivation, and Definition of the Terms used in Medicine and the Allied Sciences. By GEORGE M. GOULD, A.M., M.D., author of "The Student's Medical Dictionary;" "12,000 Medical Words Pronounced and Defined;" "The Meaning and the Method of Life;" Editor of *The Medical News;* President, 1893–94, American Academy of Medicine; one of the Ophthalmologists of the Philadelphia Hospital. Philadelphia: P. Blakiston, Son & Co., 1894. Price, full sheep, net, $10.00; half morocco, net, $10.00; half Russia, with thumb index, net, $12.00.

This work is perhaps the most generally helpful addition to medical literature which has been made in recent years. A new dictionary of broader scope and in closer harmony with the growth of medical science has long been needed, because of the almost revolutionary progress which has of late years taken place in all of its departments. The developments of not only medical science but of all branches of investigation collateral to it have flooded the literature with a host of new terms for which the student seeks in vain in the older dictionaries. The present work is *sui generis*, the result of careful research by the author and a large corps of assistants through the contemporaneous literature the terminology of which it is the exponent. It is not, as is the case with most if not all of its predecessors, a compilation and revision of the older dictionaries.

It gives the weight of its influence to the improved forms of spelling such words as orthopedic, hemorrhage, etc., and for chemical terms the rules prescribed by the American Association for the Advancement of Science, adopted by the DENTAL COSMOS at the time of their publication. These changes in spelling, while they may be occasionally objected to by those who fail to realize that growth of language is an evolutional process which is constantly simplifying, and therefore improving our methods of spelling, will as the newer forms become familiar, grow into common and accepted usage.

The work is not devoid of imperfections, as in so extensive an undertaking some errors must naturally occur. The term "broach" is defined as "a five-sided steel instrument used by dentists for enlarging the canal in the root, and opening into a decayed cavity in the crown of a tooth." Denture is defined as "a complete set of teeth—the whole assemblage of teeth in both jaws." Dentrification, a word which is an anomaly to us, is stated to be "the deposition of lime-salts on the enamel and dentine of the teeth."

The book is rich in pictorial illustrations of high artistic quality, which add much to the lucidity of the definitions. A large number of tables, upward of one hundred, in which are classified an immense number of facts and important data, give additional value to the work, which, taken as a whole, is decidedly the best, most satisfactory, and comprehensive book of its kind of which we have knowledge.

A TREATISE ON PYORRHŒA ALVEOLARIS (RIGGS'S DISEASE). A System for its Prompt, Positive, and Permanent Cure. By JUNIUS E. CRAVENS, D.D.S. 8vo, pp. 48.

In an excellent introduction to this little book, the author quotes Dr. G. B. Clement as having prepared specimens from roots affected by pyorrhea alveolaris. He finds an obliteration of the cellular elements of the cementum, these being replaced by deposits of calcic material. This is a fresh point for the believers of the uric-acid origin of the disease to note.

There are a few typographical errors. The descriptions are good, and the clinical observations worthy of praise. The treatment suggested is in accord with good surgical principles. As in all recent writings upon this subject, it furnishes further material for use by believers in the gouty diathesis as cause, although the author himself appears to have made no notes in that direction.

A CONFLICT OF EVIDENCE. By RODRIGUES OTTOLENGUI, author of "An Artist in Crime."

A MODERN WIZARD. By the same author. G. Putnam & Sons, New York, 1894.

Dr. Ottolengui, in the rôle of novelist, has made himself familiar to us by his clever story "An Artist in Crime," which appeared something over a year ago. He shows by his two later works a decided growth in power both as to style of treatment and imaginative quality, which are pleasing and satisfactory. It is not our custom to give notice to books outside the technical limits of dentistry, but the position of Dr. Ottolengui as a dental writer and the use which he makes in his later work of some of the scientific factors in our field of observation and research warrant us in making this present departure, and afford us the agreeable opportunity of calling his interesting works to the favorable attention of the dental profession.

OBITUARY.

DR. E. M. ALLEN.

DIED, at his home in Marietta, Ga., May 1, 1894, Dr. E. M. ALLEN, in the seventy-sixth year of his age.

Dr. Allen was born in Medway, Mass., June 16, 1818. He commenced the study of dentistry about 1840, with his brother, Dr. C. C. Allen, at Norwich, Conn., where he was for some time in practice. In 1844 he went South, and practiced at Milledgeville and Greensboro, Ga. In 1849 he removed to Marietta, where he was in successful practice for many years, nearly up to the time of his decease.

Dr. Allen was a skillful dentist, and was held in high esteem, not only by his patients, but by the whole community of which he was so long a prominent member. He was one of the organizers and original members of the Georgia State Dental Society, and was at one time its president. He will be greatly missed among the members of that organization. He was a member of the Presbyterian Church, and was an upright Christian gentleman, a tender husband, a devoted father, and a good citizen.

In 1847, Dr. Allen was married to Miss Eliza C. Park, of Greensboro, and she and one daughter survive him.

DR. W. W. WHITE.

DIED, at Lebanon, Mo., April 6, 1894, Dr. W. W. WHITE, in the seventy-first year of his age.

Dr. White's death was the result of injuries sustained by being thrown from a carriage. He was born at Pittsburg, Pa., in 1823, and received his dental education in Philadelphia some forty-five years ago. He commenced practice about 1861 in Huntingdon county, Pa. He had, however, been in practice at Lebanon, Mo., for the past twenty-five years.

Dr. White was married in 1862 to Miss Sallie J. Ross, of Huntingdon county, now deceased. Four children survive them.

DR. F. E. WARD.

DIED, at New Bedford, Mass., May 14, 1894, of paralysis of the large intestine, FRANK EDWARD WARD, D.M.D., in the fifty-seventh year of his age.

Dr. Ward was born at Poughkeepsie, N. Y., September 14, 1837. He commenced the study of dentistry in 1858 with Dr A. H. Tobey, and entered upon practice at New Bedford, Mass., in 1863, where he had been in continuous and successful practice up to the time of his decease. He was a graduate of Harvard Dental School, class of 1870.

Dr. Ward married Miss Olive Brals, of New Bedford, in 1862, and she, with one daughter, survives him.

DR. GRAHAM A. WELLS.

Died, at Indianapolis, Ind., June 24, 1894, of valvular disease of the heart, Dr. Graham A. Wells.

Dr. Wells was one of the oldest dentists in Indianapolis, having settled there in 1856, and been in continuous practice nearly up to the time of his decease. He was born at Red Creek, N. Y., and studied dentistry at Rochester and in New York city. He was reputed a skillful dentist, and was very successful in general practice. He had been in ill health for about two years, and spent the last winter in Texas, with the hope of benefit, but died in about one month after his return home.

Dr. Wells was twice married,—first to Georgiana Elgin, in 1860, who lived but a short time; and secondly, in 1864, to Amelia H. Smith, of Cincinnati, who survives him. He was a member of the Presbyterian Church. His remains were interred at Spring Grove Cemetery, Cincinnati.

DR. A. O. RAWLS.

At the annual meeting of the Kentucky State Dental Association, held in Louisville, June 19, 20, and 21, 1894, the following resolutions were adopted:

Whereas, It has pleased an all-wise Providence to remove from our midst our fellow-practitioner and friend, Dr. A. O. Rawls, of Lexington, Ky.; therefore be it

Resolved, That in the loss of Dr. Rawls our association has lost an active and useful member, and the profession at large a man who was always ready to use his talents and energy for the advancement of its interest. He was brave and fearless in advocating what he believed to be right, and ever ready to lend a helping hand to the younger men of the profession by his counsel and advice;

Resolved, That our sympathies be extended to his bereaved widow and daughter in their sorrow and bereavement;

Resolved, That a copy of these resolutions be spread on the record, and a copy sent to the family and dental journals for publication.

J. B. Alexander,
Charles E. Dunn,
Howard Van Antwerp,
Committee.

PERISCOPE.

Death under Nitrous-Oxid Gas.—The letter of Sir George Johnson in *The Lancet* of March 31, will, I feel sure, attract considerable attention. It is partly devoted to a description and explanation of the vascular changes which are brought about when nitrous-oxid gas is administered free from oxygen, and partly also to suggestions for the treatment of the arrested breathing which may, under certain circumstances, arise during or after such an administration. Concerning the vascular changes which take place under nitrous-oxid gas I shall say but little, as I am more particularly desirous of referring to the prevention and treatment of the suspended respiration which may arise under nitrous-oxid gas when it is given in the customary manner,—*i.e.*, free from oxygen. It is not only the fortune, but the misfortune, of nitrous-oxid gas to be the safest general anesthetic known. The misfortune is apparent in the fact that no attempts of a widespread character have been made to reduce the already small death-rate of this anesthetic. This is surprising, and perhaps blameworthy, when we reflect that we have in oxygen the physiological antagonist to the wholly unnecessary and occasionally dangerous symptoms which attend the administration of nitrous-oxid gas by the customary method. In the remarkably few fatalities which have arisen under nitrous-oxid gas, suspended respiration has been the most prominent of all features, and it is therefore to the causation, prevention, and treatment of this state that we must direct our attention I have elsewhere pointed out that even under ordinary circumstances when a full dose of nitrous-oxid gas free from oxygen is given there is a tendency, more especially in certain types of patients, to occlusion of the air-way, a tendency which arises from the larynx being spasmodically and intermittently drawn up to meet the epiglottis. This intermittent elevation of the larynx comes on with other clonic muscular movements, and, like them, usually quickly passes off when air is admitted by the removal of the anesthetic. But under certain circumstances —*e.g.*, if the gas is given for too long a time, or if certain local conditions favorable to the continuance of obstruction are present—the occlusion persists. Venous engorgement with consequent swelling is one of these favoring conditions, and such engorgement is most liable to lead to obstruction in plethoric, stout, or bloated subjects, or when pre-existing narrowing of the air-tract is present. The fact that in two of the recorded cases of death under nitrous-oxid gas enlargement of the tonsils was present is significant in this connection. Fixity or lessened mobility of the lower jaw, rendering the removal of the epiglottis from the larynx difficult or impossible by the usual means—viz, pushing the lower jaw forward—is another condition favorable to the persistence of obstruction. No doubt general respiratory spasm, or respiratory paralysis without obstruction or spasm, may be a factor in the causation of suspended breathing under nitrous-oxid gas in some cases; but there is good reason to believe that mechanical occlusion of the air-way, brought about in the first instance by spasm of muscles capable of raising and fixing the larynx (the spasm being part of a more or less general condition), is the chief factor in most cases.

Respiratory arrest under nitrous-oxid gas may be regarded as the penultimate link in a definite chain of symptoms indicative of oxygen deprivation. The last link is cardiac failure. The antecedent links are cyanosis, increasing acceleration of pulse, wide dilatation of the pupils, clonic and tonic muscular spasm in various parts, and guttural stertor, tending, under certain circumstances which have just been suggested, to pass into obstruction. All these symptoms are merely incidental to the administration. They do not contribute to the anesthesia, for the admixture of oxygen with the nitrous-oxid gas prevents them without interfering with the anesthesia. In fact, the anesthesia is rendered deeper owing to the possibility of introducing into the circulation quantities of the anesthetic gas which, in the absence of oxygen as their vehicle, cannot be introduced owing to the respiratory obstruction and spasm which arise in the absence of oxygen.

Sir George Johnson has not referred to the use of oxygen with nitrous-oxid gas. It is true that this method is a modern development in anesthetics which can only hope to find favor, at all events at present, with those who very frequently administer nitrous-oxid gas. But this is no argument against the addition of oxygen whenever practicable and whenever the circumstances of the case seem to call for it. As is well known, we are indebted to the late Paul Bert for the suggestion of administering oxygen with the anesthetic gas. But, curiously enough, both experiment and practice led this distinguished observer to regard an increase in the atmospheric pressure (which he obtained by conducting the administration inside an air-tight chamber) as essential to success, and owing to this fact the method gradually fell into disuse. Within recent years, however, it has been found that, when certain details are attended to, this increased atmospheric pressure is really not necessary, at all events for brief operations such as the bulk of those in dentistry and orthopedic surgery. A proper proportion of oxygen may, in fact, be advantageously administered with nitrous-oxid gas, by a comparatively simple apparatus, in almost every case requiring the anesthesia obtainable by the latter gas, excepting of course those cases in which nitrous-oxid gas is used to precede ether. In certain patients, such as those addicted to alcohol, morphin, etc., the use of oxygen in the proportion necessary to obviate cyanosis and stertor may interfere with good anesthesia, and in such cases either small proportions of oxygen should be given or none at all. But in something like ninety per cent. of all cases the method in question is so advantageous that personally I should not think of reverting to what I now consider to be a crude and unscientific method of producing nitrous-oxid-gas anesthesia.

The differences between the phenomena produced by nitrous-oxid gas *per se* on the one hand, and nitrous-oxid gas with oxygen on the other, acquire no little significance when considered in conjunction with Sir George Johnson's observations. The swelling of the tongue, tonsils, and adjacent parts, the obstructive stertor, and the small, quick, radial pulse, which are one and all to be explained by the great accumulation of blood in the venous system when nitrous-oxid gas is given free from oxygen, cease to manifest themselves when the gas is given, as it should be given, with oxygen. We have in oxygen the very factor which is necessary to render nitrous-oxid gas a more available anesthetic, and one which deprives it of its one drawback,—viz, its asphyxiating properties ; so that I think we may say that when the two gases are so given that no obvious asphyxial complications arise, the use of nitrous-oxid gas is rendered obviously free from risk to life.—*Frederic Hewitt, in The Lancet.*

SERIOUS COMPLICATIONS OF DENTAL CARIES.—These cases serve to illustrate two of the most severe complications of neglected dental caries. In the first the amount of the necrosis was unusually extensive, and involved the removal of a considerable sequestrum. In the second case the complication of cellulitis of the neck was a much more serious one, and the risks run, as proved by the ending of the case, were much more grave. In fact, whatever the cause of the suppuration, the condition is one which calls for most active surgical treatment.

CASE I. *Dental caries ; necrosis of lower jaw ; suppurative arthritis of temporo-maxillary articulation ; partial excision of jaw.*—A woman, aged fifty-two, was admitted into the hospital on November 8, 1892, complaining of fixity of the jaw and swelling of the left side of the face. The patient stated that twelve months before admission "lumps" appeared at the angle of the jaw and left side of the face, and at the same time she began to experience difficulty in opening her mouth ; this had been gradually getting worse. The swelling of the face had been opened in three places, and a considerable quantity of matter had been let out. The patient was unable to open her mouth for more than a quarter of an inch, and she only did this with difficulty. The second and third left lower molars were found to be carious. There were several sinuses round the angle of the jaw and left side of the face and neck. One of these, directly beneath the zygoma, was found to lead down to bare bone. Another sinus was situated about half an inch behind the ramus, and there were two or three more about the angle of the jaw. On November 13 the patient was anesthetized, and the jaw was wedged open ; at the same time the last two lower molars were extracted. As the patient was still unable to open her mouth to any extent, she was again anesthetized on the 30th. A vertical incision was made from just below the zygoma over the ramus nearly as far as the angle, and from the upper end of this incision another passed horizontally forward just below and parallel with the zygoma. The temporo-maxillary joint was found to be suppurating, and the inferior maxillary bone as far forward as the inferior dental canal to be necrosed. The bone was disarticulated, the necrosed bone was removed in three pieces, and the glenoid cavity was scraped. The wound at first suppurated freely, but the patient was discharged on January 13, 1893.

CASE 2. *Dental caries ; alveolar abscess ; angina Ludovici ; septic pneumonia ; death.*—A rather weakly looking man was admitted into the Middlesex Hospital on April 13, 1892, with a large tender swelling beneath the jaw. The patient gave a history of having felt strong and healthy until two months previously to his admission, when he began to feel "out of sorts." On April 1 he had pain in the first right lower bicuspid, with some swelling beneath the jaw. He obtained some relief from a mixture obtained from a chemist, but the swelling in the neck did not subside, and on the 10th he had the tooth extracted at a hospital. The patient became weak and ill, and the swelling became more painful. He had a shivering fit on the 12th, and on the following day was admitted into the Middlesex Hospital. On admission, a red, tense, tender swelling was found extending beneath the whole length of the lower jaw and reaching backward to the angle on either side. The skin over the tumor was brawny, and fluctuation could be obtained. The breath was very offensive, and on pressing over the swelling fetid pus escaped from the socket of the first right lower bicuspid. The temperature was 102° F., the pulse 120, and the respiration 36. The patient was at once anesthetized, an incision an inch in length was made in the middle line, and an abscess-cavity was opened about one inch below the surface. About an ounce and a half of fetid, brownish-colored pus escaped. The wound was irrigated with perchlorid of mercury, and fomentations were applied. After the operation the patient appeared to be easier, but the temperature and pulse remained the same. On the 14th he complained of pain behind the manubrium sterni. The pulse became irregular in volume and rhythm, and a few crepitations were heard over both chests. The wound was thoroughly irrigated, and three ounces of brandy were ordered. Later the cough became rather troublesome, and the amount of brandy was doubled. During the next two days the patient became very prostrated, and the pulse was weaker, but more regular. There was some dyspnœa, but no cyanosis. He could not lie down or sleep for more than a few minutes together. His appetite remained good. On the 17th the pulse became very weak, and dyspnœa was more marked, but no cyanosis was present; the apex of the heart-beat lay in the fifth interspace, half an inch outside the nipple-line. No friction was heard over the cardiac area; the pain behind the sternum became more marked; slight friction could be heard on the right side, and crepitation was just audible over both lungs. The expectoration was more viscid and blood-stained. Half an ounce of brandy was given every hour. On the following day the pulse became weaker, but rather more regular; the patient became delirious, and his breathing difficult and noisy. He sank and died on April 20, 1892 —*Lancet*.

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HINTS, QUERIES, AND COMMENTS.

A Novel Dental Operation.—My son, aged two years, has chalky superior incisors, while the rest of his teeth seem to be of a better quality. We often see this condition in children's mouths, dilapitated or missing superior incisors long before their permanent successors are ready to erupt, although the rest of the temporary teeth are in fairly good condition.

In this case they were clipped off until the laterals, especially, were nearly even with the gum-margin on the labial aspect. They were getting sensitive, for he kept them more or less protected by his lip and would never use them to bite upon.

I decided to prevent their premature loss if possible. By the use of steel dies I struck up four gold caps, of 34 gauge, soldered joint and cutting-edge to give strength, dried the teeth, and set caps with oxyphosphate cement.

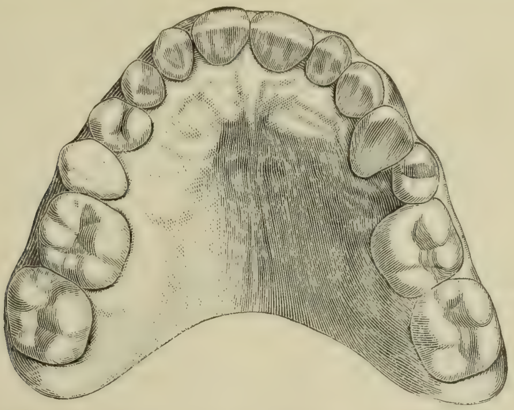
They have now been in position about a month, and from all appearances the operation is a perfect success. The crowns are so small and their shape is so natural that their appearance is not objectionable, especially when compared with their former condition.

The boy no longer avoids biting upon the teeth, nor does he keep them protected from thermal changes; on the contrary, he takes great delight in displaying them to many curious observers. The whole operation of making and setting the caps is by no means difficult, nor is the setting of them painful for the child.

Whether or not this is the first case of the kind on record, I am quite certain that it will not be the last.—W. H. Baldwin, D.D.S., Norwalk, Conn.

To the Editor of the Dental Cosmos:

Sir,—I send you a model of a peculiar case which came to my notice recently. A gentleman, age thirty-five years, applied to have his teeth examined. In examining the teeth of the upper jaw, I found that the temporary cuspids were still in position and in good shape. On the left side the permanent cuspid occupies the position the first cuspid should, which is not strange; but on the right side the permanent cuspid has erupted directly back of the first bicuspid, occupying the *second* bicuspid space.



The missing bicuspids have never erupted, and, with the exception of this deformity, the man has perfect teeth. R. B. Foster.

Caps for Gold Crowns.—In the June Cosmos, under head of "Hints, Queries, and Comments," Dr. Milton gives a "Method of Making Caps for Gold Crowns" by using two tin or iron boxes. My procedure dispenses with the tin boxes, and is as follows:

Take the small impression-cup of Melotte's and first fill it with compound. Select a tooth the cusps of which are suitable (Logan crowns make the most perfect forms), press it down into the compound, leaving enough exposed to form the cap. Smooth the compound, have the exposed cusps clean and dry, place the rubber ring on, and while you are heating the fusible metal hold a hot instrument against the cusps. Pour slowly and agitate the cup while pouring, and you will have a die with smooth and polished surface. The same principles of procedure are suitable for cuspids and incisors.—E. D. Biddle, Evansville, Ind.

Function of the First Permanent Molar.—An important function of the first permanent molar is that of fixing the bite. Erupted at a time antedating any of the other permanent teeth, by the time the bicuspidati are erupted it is fully formed and fixed; a bulwark against the forcing backward of the anterior teeth, and holding the maxillæ apart, so there will be no interference with the proper eruption of the incisors. Interference (unwise) or removal before the eruption of the bicuspidati, permits aberrations in the anterior articulation. Regulating caps, worn as a means of holding apart the jaws in regulating teeth, tend to shorten the exposed portion of its crown and produce, in a less degree, the same effects. If the cuspidati are the keys of the arch, the first molars are the pillars.—Henry Burchard.

To the Editor of the Dental Cosmos :

Sir,—Replying to the inquiry of "W. C. G., L.D.S.," in the July issue of the Dental Cosmos, I not only deprecate the use of the hood inhaler, but of all similar devices by which the lips are covered from view during the administration of nitrous oxid. In my practice I use the plain inhaler, which is large enough to nearly fill the space between the lips when the mouth is open. The lips, during the administration, are held in place above by the first and second fingers of the left hand, the third finger and thumb of which are used to close the nose. The under lip is held by the first finger and thumb of the right hand. This method is in no case objected to by patients, as in all instances their full consent is demanded and obtained beforehand, so that the giving of the gas may be carried out without resistance upon their part.

I have in my published articles stated some of the grounds for my objection to the face-piece inhalers, and in a future communication shall elaborate my views upon the subject more fully. J. D. Thomas.

Pliers for Liquids.—Dr. Randell Barrett, of Norfolk, Va., notes the readiness with which a little liquid, as alcohol, for instance, may be caught between the beaks of a pair of plugging-pliers, carried to a tooth-surface or cavity, and by simply opening the plier-beaks be deposited as a single drop. He suggests the greater facility with which a larger volume of liquid can be included within suitably half-hollowed or semi-cylindered beaks. The Jamison Pliers will serve to demonstrate the suggestion, and it is somewhat surprising to observe the up-hill flow of the liquid as the pliers are opened, for example, upon the coronal surface of an upper molar.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a Thesis.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JUNE, 1894.

June 5.—No. 520,867, to RUFUS G. STANBROUGH. Dental engine.
" " No. 521,138, to WALTER A. CROWDUS. Electric motor for dental engines.
June 26.—No. 521,930, to THOMAS H. GRAHAM. Dental plate.

THE

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ORIGINAL COMMUNICATIONS.

EXPERIMENTS RELATIVE TO THE FORM IN WHICH ARSENIOUS ACID MAY BE BEST APPLIED FOR DEVITALIZING THE PULPS OF TEETH.

BY W. D. MILLER, M.D., D.D.S., BERLIN.

THE question of the action of arsenious acid upon the human economy has long been a subject of investigation among pharmacologists and physicians. Nevertheless, the way in which the complex of symptoms characteristic of arsenic-poisoning is brought about remains to the present a subject of dispute.

According to the theory of Liebig,* arsenic acts upon living tissue in a manner similar to sublimate, the tissue being converted into an albuminate of arsenic ; at the same time, of necessity, losing its vitality. This theory received little credence because it does not accord with the most common observations regarding the local action of arsenic, and because all attempts to produce an albuminate of arsenic have thus far failed.

The oscillation theory of Binz,† which has attracted much attention, notwithstanding its ingeniousness seems to meet with a great deal of adverse criticism.

By a series of experiments on animals, Binz arrived at the following results :

1. In the living organism arsen*ious* acid is converted into arsen*ic* acid, and arsen*ic* acid into arsen*ious* acid.

2. These two transformations are brought about in a short time by protoplasmatic tissue, within as well as without the animal body.

3. Those tissues which during life are most affected by the action of arsenic are the ones to most readily give up their oxygen to arsenious acid outside of the organism.

From these results Binz came to the conclusion that the conversion and retro-conversion of these two acids into each other bring about a violent oscillation of the atoms of oxygen within the protoplasm, and this is the cause of the poisonous action of arsenic. It acts only as the carrier of oxygen.

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* Die Chemie in ihrer Anwendung auf Agricultur und Physiologie, 1843.

† Pharmacologie, 2. Aufl., 1891, p. 417.

Binz compares the action of arsenic to the destruction of organic matter by iron in the presence of air and moisture. Ferric oxid gives up an atom of oxygen to the organic matter, becoming thereby reduced to ferrous oxid ; but this compound cannot exist in the presence of air and moisture, ferric oxid being formed almost immediately, which then again gives up its oxygen to the organic matter. This process, continued indefinitely, brings about an oxidation or combustion of the matter. In this way iron nails in wood become quite loose in time, and iron-stains eat holes in linen. Husemann,* who is the most outspoken opponent of Binz, points out that in accordance with the oscillation theory arsen*ic* acid should exert the same action or as strong an action upon living tissue as does arseni*ous* acid. This, however, does not agree with the results of experiments or clinical observations.

The discordance of the views regarding the local action of arsenic is still more pronounced. Some designate it as a violent escharotic, others assert that it has no escharotic action whatever. Some claim that it acts only upon diseased tissue. How this opinion was ever arrived at is to me incomprehensible. Some find it to act upon the central nervous system, others upon the peripheral nerves.

In regard to the patho-histological changes brought about by local applications of arsenic, I know of no investigations more worthy of consideration than those of Arkövy :†

"1. As_2O_3 brought into contact with the tooth-pulp acts in the following way : A certain degree of inflammatory hyperæmia, total or partial, depending upon the quantity of the agent applied, sets in ; the blood-vessels become expanded, and here have a tendency to thrombosis. This latter effect may also be in connection with embolism of the capillaries, when the agent is quickly taken up into the blood-vessels.

"2. As_2O_3 produces no coagulation of tissue whatever.

"3. It has a specific influence upon the blood-corpuscles, combining with the hæmoglobin to form a compound of arsen-hæmoglobin, and of this chemical process there seems to be evidence in the profuse yellowish tinge of the whole pulp-tissue, and in the discoloration of blood in several of the blood-vessels.

"4. In nearly every case it is taken up in substantia (in form of molecules) into the blood-ways ; when there it produces, besides the above-mentioned changes, granular detritus of the contents and anæmic collapse, shrinkage,—the latter effect being brought about nearly exclusively in cases where greater doses were used.

"5. The bulk of the pulp-tissue—viz, connective-tissue fibers and odontoblasts—undergoes no change whatever ; not so the connective-tissue cells, which increase three to four times their normal size.

"6. The special action of arsenic trioxid upon the nerve-elements consists in the following : The neurilemma is only so far influenced that its nuclei are somewhat increased ; a more essential change takes place in the axial part, where, after the application of more than one mgrm., granular detritus of myelin sets in, and the axis-cylinder

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***Deutsche med. Wochenschrift*, 1882, Nos. 48–50.

† Transactions Internat. Med. Congress, Dental Section, London, 1881.

commences here and there to disappear. As a very surprising alteration may be regarded the notchy tumefaction of the axis-cylinder, described heretofore almost only in cases of central lesions.

"7. All these alterations occur in and among normal-looking tissue.

"8. The action of arsenic trioxid is macroscopically exhibited by a brownish-red tinging of the whole or of certain parts of the pulp-body, as well as of the neighboring dentine and cementum, this latter in cases treated with greater doses,—viz, two to five mgrms. This alteration is most expressed at the top of the crown-pulp and at the apical one-fourth to one-third part. This circumstance may be considered as an external evidence of the devitalization being completely attained to."

In view of the results obtained by Arkövy, I thought that I might be spared the labor of extending my investigations to the histological changes which are produced by local applications of arsenious acid, devoting my time chiefly to the clinical aspect of the question, and in particular to the question, In what form should local applications to the dental pulp be made?

In applying arsenic to the pulps of dogs' teeth, it is impossible to bring about the same conditions in every case; either the pulp is more exposed in one case than in the other, as it is more wounded, or the bleeding may interfere more in one case than in the other. Again, the quantity of arsenic applied cannot be *absolutely* the same in all cases, etc.

To eliminate these and various other sources of error, it is necessary to make a large number of experiments, which, as every one knows who has experimented upon dogs, is a matter of great difficulty. Experiments upon pulps have the further inconvenience that it is impossible to study with the naked eye changes which are going on in the pulp *intra vitam*, and which may be of great aid in determining the nature of the process. Chiefly, however, for the reason that my experiments dealt with the comparative action of various forms of the paste, I found it desirable to choose a subject for experimenting upon which was more easily accessible than the pulp of dogs' teeth. A few trials only were made on frogs and rabbits, as these animals soon proved to be ill adapted to the purpose.

The greatest number of experiments was made on the tails of white mice. This organ presents in so far a similarity to the pulp, as it is comparatively long and narrow, and traversed in the direction of its length by central blood-vessels and nerves.

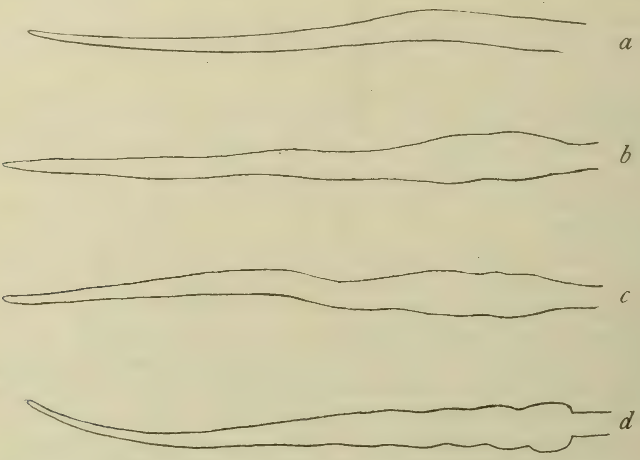
To make the similarity greater, I passed, in some cases, a glass ring over the tail, fitting closely at the root, to take the place of the constriction at the apical foramen.

Again, in a number of cases I inclosed the tail, after applying the arsenic, completely in a plaster cast. This was accomplished by filling a proper-sized glass tube with a thin mixture of plaster of Paris and drawing it over the tail, or rather drawing the tail into it by means of a thread tied to the tip of the tail. Finally, for this operation, tubes were used which were broken through on one side about an inch from the end. As soon as the cast had hardened, the plaster was removed through this opening sufficiently to expose the tail, at a circumscript point. The slit was then made, arsenic paste applied, protected by gold foil, and the opening closed with plaster of Paris.

To whatever part the arsenic was applied, the most prominent symptom manifested was the enormous swelling and œdema (except where the tail was inclosed in a cast). Applied in a skin pocket above the root of the tail, the whole rump and the hind legs became intensely swollen and appeared yellowish, and semi-transparent on holding the mouse toward the light.

On incision, a large quantity of yellowish serum escaped. Complete anesthesia and paralysis of the hind legs usually resulted, the mice sometimes gnawing them off. Death frequently followed the application, unless very small quantities were used.

When arsenic was applied to the ear, after slightly scraping or cutting it, the ear appeared in twenty-four hours swollen, red, and succulent; later a portion of the ear, or sometimes the whole of the external ear, was thrown off.



Showing the action of arsenious acid on mouse-tails. *a*, normal tail; *b*, tail thirty-six hours, *c*, forty-two hours, after application of arsenic paste; *d*, tail with glass ring.

In working upon the tail, a longitudinal slit was made through the skin about one-quarter of an inch long, being careful to avoid the blood-vessels, which in white mice are distinctly visible. The skin-flaps were slightly raised and the paste inserted. In twenty-four hours marked swelling extending about one-half an inch in each direction from the point of application, sometimes over the whole tail. In the vicinity of the wound the tissue appeared reddish to bluish-red; farther removed there was sometimes no reddening whatever, the tail appearing swollen, waxy, and œdematous. In forty-eight hours the whole tail was intensely swollen, bluish-red; in many cases the skin was found cracked open and drops of serum exuding. A free flow of serum followed an incision. In seventy-two hours tail blue and wilted (dead). Complete anesthesia of the greater part of the tail was found to be present in about forty-eight hours.

The action of the arsenic appeared somewhat accelerated in those cases where a closely-fitting glass ring was put on the tail near the root, and the arsenic applied one-quarter to one-half an inch below the ring. These rings were set on the root of the tail with gum arabic or plaster of Paris, and allowed to remain for twenty-four hours before the arsenic was applied. This precaution was taken in order to make sure that the ring was not tight enough to produce any disturbance in the circulation.

In more than forty cases, there was not one in which the action of the arsenic extended beyond the ring.

One of the most pronounced symptoms produced by the arsenic is the œdema. This fact suggests the thought that the death of the pulp might be due in part to a strangulation brought about by the pressure within the rigid walls of the pulp-chamber. If this were the case, we should expect tails in a plaster cast to be devitalized more quickly than when they were free to expand. The experiments did not, however, furnish much evidence in favor of this view. The difference was so slight that I was obliged to repeat the experiments fifteen times before I could come to a conclusion, which is, that the action of the arsenic is not appreciably influenced by enveloping the organ in a rigid cast. In some cases the action appeared to be more diffuse, in some loss of sensibility appeared to occur sooner, but no constant pronounced difference could be detected.

From these results we cannot, however, with certainty, conclude that the pressure within the pulp-chamber has no part in bringing about death of the pulp, since its effect may be compensated for by a diminished absorption of the arsenic, resulting from the increase of pressure within the tissue. That the death of the pulp is not due solely to a strangulation of the vessels at the apical foramen will be evident from the fact that arsenic acts locally upon tissue that is perfectly free to expand. The action of arsenic is of a progressive nature, beginning at the point of application and extending gradually in each direction. The peripheral portion of the tail, of course, dies *in toto* as soon as a complete stagnation is brought about at the point of application of the paste.

The view formerly entertained by many, that arsenic acts only upon diseased tissue, is untenable.

Arsenic is still described by many as a powerful escharotic, although nearly all who have experimented with it have pointed out that it has no action of the nature of the well-known escharotics, such as carbolic acid, chlorid of zinc, etc.

The local application produces no immediate visible effect whatever.

It is well known that different tooth-pulps show very great differences in their susceptibility to the action of arsenic. The age of the patient, the size of the pulp, the freeness of the exposure, and particularly the condition of the pulp as to calcifications, have a marked effect upon the rapidity of absorption of the paste, so that, while in many cases death of the pulp occurs within twenty-four hours, in others again repeated applications may be necessary to accomplish the purpose. The rapidity of action naturally depends to a certain extent upon the amount of arsenic applied, and upon the action of the substances with which it is incorporated.

The form in which arsenic was for many years solely applied to the pulp is in connection with creasote or carbolic acid and morphia; in later years we hear much of the essential oils and lanolin as base, with addition of iodoform, cocain, etc., to prevent the pain often attendant upon the devitalizing process.

I have experimented upon mice, and to some extent upon dogs, with the following combinations:

1. Arsenious acid; chlorid of zinc.
2. Arsenious acid; carbolic acid.
3. Arsenious acid; oil of cloves.
4. Arsenious acid; lanolin.
5. Arsenious acid; thymol; oil of cloves.
6. Arsenious acid 1; thymol 2; oil of cloves.
7. Arsenious acid; glycerin.
8. Arsenious acid; 5 per cent. aqueous solution of common salt.
9. Arsen*ic* acid.

In each case a sufficient quantity of the liquid was added to form a paste. No. 9, being deliquescent, soon formed a paste of itself when exposed to the air.

No. 1 applied to the ear produced shriveling at the point of application, caused by the chlorid of zinc. This prevented the absorption of the arsenic, and consequently the characteristic arsenic effect did not appear at all.

On the tail the *escharotic* action of the *chlorid of zinc* was very pronounced, in half an hour a white patch having formed one-fourth to one-half inch long and extending half-way around the tail.

At the same time a marked contraction or constriction of the tail was produced. This constriction apparently retarded the absorption of the arsenious acid, the rapidity of action, on the whole, being less than where the mixture No. 2 or 3 was used.

Application of No. 2 to the ear produced more or less redness and swelling, with death of a limited portion of the ear.

No. 3 produced a much more powerful action than either 1 or 2, when the application was made to the ear or to the tip of the tail. When applied under a skin-flap near the root of the tail, it did not act so very much more promptly than No. 2, though, on an average, there was still a difference in its favor.

No. 4 produced but very slight action in all cases; usually it was little more than zero.

In the Dental Cosmos for 1893, page 805, I called attention to the fact that the pain which is so frequently produced by applications of sublimate to the teeth may be in a great degree or entirely avoided by the addition of thymol. This led to the thought that thymol might be a valuable ingredient of arsenic paste.

Experiments were accordingly made with the mixture No. 5. As was anticipated, the action was much milder than that produced by No. 3, since a given quantity of the paste contains only about half to two-thirds as much arsenic as an equal quantity of No. 3. It was, however, equal to that produced by an application of a mixture of morphia and arsenious acid in oil of cloves, and we have reasons for thinking that the local anesthetic action of thymol exceeds that of morphia. Many, indeed, deny that morphia has any local anesthetic action at all. Thymol has, further, the decided advantage of a considerable antiseptic action. At the Dental Institute I have been making use of a paste having the following composition:

℞—Thymoli,
Acidi arsenicosi, āā x;
Ol. caryoph., q s. ut ft. pasta.

We have no reason thus far to be other than satisfied with the results. One disadvantage of this mixture lies in the fact that part of the thymol separates from the arsenic in crystalline form, rendering it necessary to stir the paste from time to time. This difficulty might no doubt be overcome by a slight alteration in the composition of the mixture, possibly by the addition of glycerin.

The effect produced by applications of No. 6 was decidedly less than that by No. 5. Further dilution of the paste was not attempted, although we are perfectly safe in concluding that by increasing the proportion of thymol we may reduce the strength of the paste to any desired extent.

A paste made of arsenious acid with water acted quite as promptly as when oil of cloves was used. Nos. 7 and 8 were tested each only four times. They produced the impression of acting at least as promptly, if not still more rapidly, than the paste with oil of cloves. The action of *arsenic* acid was very marked. A small quantity of this taken upon a glass slide deliquesces immediately, so as to form a thin paste. An amount of this about equal in size to the head of a pin, applied to a slit in the tail of a mouse, caused death in four cases out of five inside of four hours; paralysis of the hind legs, diarrhea, and, in one case, convulsions, being the chief symptoms.

Arsenic acid also produced a local escharotic action, similar to that of carbolic acid, though in a much less degree.

In the fifth case, the mouse showed the symptoms just stated to such an extent that it was expected to die at any moment; it recovered, however, and on the following day appeared perfectly well; the local action was scarcely visible.

The results recorded above point to the following practical conclusions:

1. The rapidity and intensity of the action of arsenious acid depends, under certain circumstances, to a very considerable degree upon the substance or substances with which it is incorporated.

2. Where there is but a small point of exposure, and in particular where extensive calcification has taken place in the pulp, escharotics should be avoided, since the contraction of the tissue retards the absorption of the arsenic. This retardation is but slight where there is a broad surface of exposure.

In stubborn cases where applications of the ordinary paste fail to effect the devitalization, a paste consisting of arsenious acid in oil of cloves, glycerin, or salt solution should be employed, undiluted by any third constituent.

3. Thymol is worthy of a trial as a substitute for morphia, on account of its anesthetic and antiseptic properties.

4. For devitalizing pulps of milk-teeth or remains of pulp-tissue in root-canals, arsenious acid, if employed at all, should be diluted by two to three parts of some other constituent (thymol, oxid of zinc, morphia, iodoform).

In fact, in all cases where, for any reason, a milder action of the arsenic is desired, it may naturally be employed in this diluted form. In these cases Arkövy recommended the use of pepsin for devitalizing the pulp.

The question naturally arises whether results deduced from experiments on mice apply equally well to the pulps of human teeth. It is my impression that such is the case. Nevertheless, it would undoubtedly be well to supplement the above experiments by experiments on the pulps of teeth, although it will always be found very difficult to secure the variety of conditions in dogs' pulps which we meet with in the pulps of human teeth. Experiments on nine teeth (three dogs) gave results which fairly correspond with those reported above.

I give the results of my experiments to the profession at this time because I am about to interrupt my work for three months, and do not care to delay so long with the publication.

IMPLANTATION OF DECALCIFIED TEETH.

BY DR. OSCAR AMOEDO,

PROFESSOR OF THE ÉCOLE ODONTOTECHNIQUE OF PARIS.

(Read before the Eleventh International Medical Congress, Rome, 1894.)

DENTAL implantation was introduced in oral surgery in 1886 by Dr. Younger, of San Francisco, Cal.

This operation consists in making an artificial alveolus in the alveolar ridge and fixing a tooth in it.

It is largely performed in America, and according to the reports presented last year to the International Dental Congress of Chicago, after eight years' experience, seventy-five per cent. of the implanted teeth continue to render very good service. Dental implantation is considered in the United States as a permanent operation, and Dr. Ottofy, in his report addressed to the same congress, made the following statements:

1. Implantation has been practiced for a sufficiently long period to entitle it to be accepted as a legitimate operation in oral surgery, which the dental surgeon should have the privilege to perform, assuming the attendant risks as he is doing in other operations. This statement is made as the result of observations extending over a period of nearly eight years.

2. That in view of the fact that all dental operations are more or less of a transitory character, implantation deserves to be classed as a permanent operation in the same sense in which other operations performed by dentists are considered permanent, and it should not be considered merely a fanciful experiment.

3. That no operation of the dentist so nearly reproduces nature as that of an implanted tooth, and, when successful, the result in appearance and comfort cannot be excelled by any other operation within the domain of the entire science of dentistry.

4. That the operation should not be performed in any cases except those which have been as carefully selected as they would be and as they are for other operations.

The success of this operation is due principally to two great discoveries,—local anesthesia by cocain, and antisepsis.

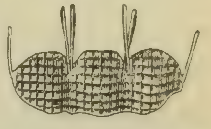
Thus, one injection of cocain produces such complete anesthesia that the bone can be trepanned without inflicting any suffering on the patient.

Antisepsis makes the operation devoid of all danger. All infectious inflammation and the contagion of tuberculosis and syphilis are also avoided. The only complication that can result is absorption of the root and the subsequent loss of the implanted tooth, an identical phenomenon to that which happens to milk-teeth.

This accident occurs generally when the root has not been sufficiently fixed, on account of the occlusion with the antagonizing teeth ; especially is this so with the cuspids. To avoid this, I always make use of very solid platinum-wire ligatures for the bicuspids ; for the incisors and the cuspids I employ a little apparatus invented by myself.

This apparatus (see Fig. 1) consists of a plate of pure checked silver (Michael system), adapted with a burnisher to the back of the three incisors when there is only one implantation. Six platinum wires are soldered to the plate. Of these, two single ones are attached to the end of it, and two double ones in the place corresponding to the junction of the implanted tooth and the two neighboring ones.

FIG. 1.



After having filed and adjusted the apparatus, it should be attached to the back of the teeth with cement. The platinum wires are then passed between and twisted round the front near the necks of the teeth. This apparatus, thus constructed and applied, makes of the three teeth a solid block, and immobilizes them.

Fig. 2 represents the apparatus seen from the back of the incisors, and Fig. 3 from the front.

FIG. 2.

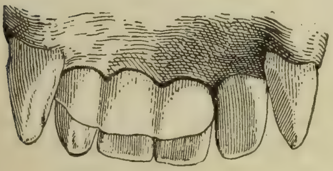
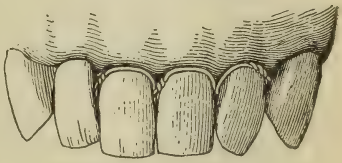


FIG. 3.



I was lucky enough, during my investigations, to discover in the laboratory of Dr. Poirier, of the Paris Faculty, an inferior maxilla with a second milk molar ankylosed between the first permanent molar and the first bicuspid. A part of the root of this milk-tooth was reabsorbed. On account of its fixity, a process of calcification resulted which had the effect of finally soldering the tooth to the maxilla, causing the pulp to disappear. This was replaced by an osseous tissue.

To explain the consolidation of the implanted, reimplanted, or transplanted tooth (in the three cases the work of consolidation is the same), three theories have been advanced :

1. Revivification of the pericementum of the tooth and adhesion to the alveolar wall.

2. Encysting of the root in the alveolus.

3. Intimate soldering of the root to the bone.

In the first case, the tooth retains its pericementum. Once introduced in a natural or artificial alveolus, it is asserted that the pericementum is revived, even a long time after it has been out of the mouth. Vital relations are established directly with the bone (in case the alveolus is artificial), or with the alveolar periosteum (if the alveolus is natural). In this case all returns to its normal state.

In the second case, the tooth is said to become encysted, as a lead bullet is in the bones; or more properly said, the pericementum does not play any part, and the tooth is only kept in its place by the intimate compression of the alveolar walls, without any soldering of the surfaces.

In the third case, the pericementum becomes useless, and a real adhesion takes place between the root and the alveolar wall.

I consider the theory of reviving the periosteum entirely wrong; the roots implanted or reimplanted are deprived of all movement, and produce, on percussion, a clearer sound than the neighboring teeth. It is impossible, therefore, to admit the existence of a periosteal membrane between the root and the alveolus.

The theory of the tooth becoming encysted is also not acceptable. Histological examinations have demonstrated that the osteoblasts which originate from the receiving bone penetrate sometimes even to the cavity of the pulp.

The only explanation left, therefore, is the fusion of the root and the osseous wall by a chemico-vital process. In fact, according to my view, this is what takes place: the implanted tooth, acting as a foreign body, irritates the bone and produces an osteitis with formation of lymph-cells, which are arranged in line and form an embryonal membrane throughout the periphery of the alveolus. These embryonal cells advance toward the root until they cover it. The decalcification and the erosion of the root begin, and afterward can be seen how the osteoclastic cells, giant-cells with acid reaction (lacteous acid), which form little bays on the surface of the root, have been formed. If, then, the tooth is sufficiently firm and the general condition of the patient is good, the root does not act any longer as a foreign body, and the resorption stops.

The embryonal tissue formed between the tooth and the alveolus is soon vascularized; by degrees calcareous deposits are also formed, and the progress of the osseous transformation can be followed, until finally the root and the alveolar wall are, as it were, soldered together.

The clinical proof of what I have indicated is the clear sound produced on percussion of the implanted teeth, and the resistance to extraction. This resistance is sometimes so great that after an implanted tooth becomes consolidated it is impossible to extract it without breaking it.

For the purpose of facilitating this chemico-vital process caused by the uniting of the tooth, I decalcify with chlorhydric acid the coat of cement one-half a millimeter in depth before implanting the root. The process for decalcifying is the following: boil the tooth in mercury bichlorid, then dip during three or four hours in a solution of chlorhydric acid of ten per cent., and probe it from time to time with a sterilized knife to judge the thickness of the decalcification. As soon as the knife penetrates half of a millimeter, wash the roots and neutralize them with ammonia.

It is evident that when the root has its crown, this must be isolated from the acid with a piece of rubber-dam or a rubber tube.

The decalcified teeth can be preserved in a solution of phenosalyl of one per cent. To make use of them, the cavity must be enlarged at the apex and filled with salol liquid iodoformized. This substance has sufficient resistance to remain in the canal, and is soft enough to be absorbed in case of reabsorption of the root.

The clinical results that I have obtained with such decalcified teeth have confirmed all that I had foreseen. These teeth are more easily implanted and are more quickly and more uniformly consolidated than the dry teeth without pericementum, or even the fresh ones that have it.

But the most important point is the absolute innocuity of this method. All danger of contagion from syphilis, tuberculosis, and other affections is avoided, because these teeth are rendered aseptic and can be kept in that state.

FIG. 4.

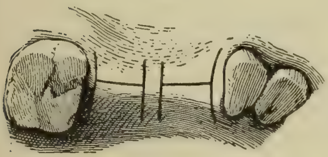
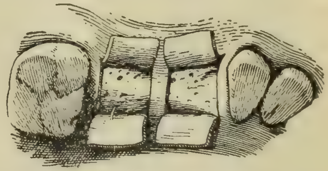


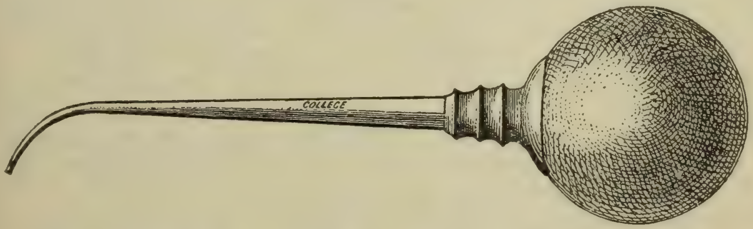
FIG. 5.



A stock of previously decalcified roots should be kept in readiness, and when they are wanted a crown in porcelain should be fixed to the root. These crowns please the client, and can be ground so as to articulate with the antagonizing teeth, losing very little of their solidity.

It has sometimes been observed, when a disk of the gum has been lifted with a circular bistoury, that the substance around the tooth implanted has diminished in size; to avoid this I make my incisions as shown in Figs. 4 and 5, and then implant the tooth. The gum falls below the normal level, but during the cicatrization it comes back to its natural state and at the same level of the neighboring teeth.

FIG. 6.



I began my experiences in 1888, and I have just received a letter from one of my first clients for whom I implanted a molar. He tells me that his tooth is still very solid and gives him entire satisfaction.

I have made one hundred and fourteen implantations. Whenever local infection has occurred I have removed the tooth immediately, and washed the alveolus with bichlorid, painted the cavity with iodin, and replanted the tooth. Whenever the consolidation has failed, this depended on the want of immobilization of the tooth.

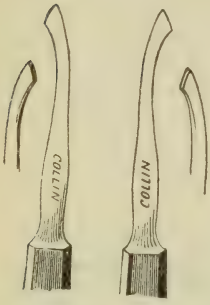
My plan of procedure for implantation is the following:

1. Disinfection of the mouth with a solution of mercury bichlorid of 1 : 4000, or phenosalyl one per cent., or permanganate of potassium 1 : 2000, injected with a syringe of my own invention (Fig. 6).

2. Injection of one centigram of phenyl-cocain (Poinsot) direct to the bone with a sterilized syringe.

3. Deep incision of the gum in the shape of an H (Figs. 4 and 5). The gum should be rapidly dissected, carrying the periosteum with two right and left instruments that I have had made for me (Fig. 7).

FIG. 7.



4. Trepanation of the bone with trephines mounted in the dental engine.

5. Implantation of the tooth introduced by a strong friction with the automatic mallet, at the extremity of which a piece of wood is attached.

6. Immobilization of the tooth implanted by ligatures or by a special apparatus.

Conclusions.

I. Implantation was introduced in oral surgery by Dr. Younger, of California.

II. It can be performed without pain by the use of cocain.

III. With antisepsis, the inflammations, the infections, and the contagions can be avoided.

IV. The pericementum disappears completely once the tooth has consolidated. The adhesion produced between the root and the alveolar wall is by chemico-vital process.

V. Decalcified teeth facilitate this work, and are more easily made and kept sterile.

HOPES AND HINTS IN DENTAL ECONOMICS.

BY J. C. WALTON, D.D.S., HOWELL, MICH.

THE statement is made editorially in the February number of the *Dental Review*, that a man of proper caliber to make a successful dentist can accomplish more in a financial way in some other pursuit. This will depend largely upon whether he shall follow the same unscientific ways to accomplish the end that the average dentist does. The care and investment of money, for instance, is, in a measure, a profession of itself; but one may, by contact with business men, imbibe the principles of success to a profitable degree, and the acquisition of wealth, adding as it does to the power and dignity of the profession, is not an unworthy ambition, nor a hope impossible of fulfillment.

It is also inferable that the editor questions the dignity of the dentist, and perhaps his honesty of practice, who manifests an interest in this aspect of the business. It would not be difficult to trace out the origin of the idea, and it is not new. The writer, however, is more concerned with the defense of an opposite theory,—that the decisive point is the point of profit. There is evidence everywhere that without profit or a reasonable expectation of profit there is no sustaining motive. We do not follow the practice of dentistry from purely philanthropic motives.

The possession of wealth *per se* is not a crime. Intellect and virtue are not to-day more than in any age of the world crushed by the huge foot of Mammon. The pathetic and dogmatic representations of ultra-professional and semi-practical writers are but the products of the super-ethical agitator's inner consciousness, and have no verification outside of his one-sided imagination. You pay tribute to a man's wisdom, industry, skill, and courage, when you call him a capitalist. The impecunious and the lazy are usually the ones to denounce the money aim. The great part that dental financiers could and will play some day in professional progress, by endowing colleges or special chairs, or creating a fund from which to support special research, ought to stimulate the aim and encourage the practice of accumulation.

Probably thirty-five million dollars are annually paid in the United States for dental services, and only about one-fourth of our people patronize dentists. It is a matter of gratification to know that the acknowledgment of our success on the part of the people is being so generously given, and their compliments and congratulations too, with a generosity befitting even our own egotistical estimate of professional worth. Thus are we encouraged to keep up to the tide-line of general progress, and when we admit in speech what we betray by action we shall enter a new era. Among other occupations may be seen motives of right and wrong flatly contradicting our own traditionary views. Why not get in line with the accepted views of the majority of mankind, and declare our position? Why should public declaration lag so far behind private sentiment?

It is time for some of us to cease emulating the ostrich, for we have no reason to hide the head. We are learning that facts do not change for not being looked squarely in the face. Hence we accept the facts as we see them ; rejoice in them as often as we can, and more often, perhaps, utilize them. But in doing so we lose no jot of loyalty to a high ideal of usefulness, and abate no tittle of the common Christlike ethics to "love thy neighbor as thyself," without specializing as to what business he may be engaged in.

Honesty to family dependents makes one responsible, in a measure, for their future happiness. There are, perhaps there always will be, some who affect to look down upon any application of dental science with an economic bearing, but it is easily proved that to utilitarian motives is traceable the main incentive to its development. Just compensation for services rendered is one of the demands of Christian ethics and social welfare. We may be perfectly poised, pure minded, polite, and practical ; we may preserve our honor and violate none of the functions of the ideal dentist ; we may deserve and receive the confidence and respect of all people, and still practice to the money aim. The fruits of our energy, of our industry, of our genius, in the field of finance, like our genius in art, should go to our credit,—in fact, does go to our credit.

Money-making, directly or indirectly, is largely, if not wholly, the governing principle in our colleges. There is no other good excuse for the existence of thirty-eight seats of dental learning. Saving money is the inducement offered us to join the Protective Association, and we smile on the success of both. It has been charged that America cares for nothing else in comparison with success in pursuit of wealth. What is there bad about it, if it is true? What are you going to do about it, if you convince yourself it is bad? Wealth is the main object of productive effort, and the accumulation of wealth is a worthy object, because by it we retain and store the power to minister to laudable desire. We may regard it as the storage service upon which to draw in seasons of scarcity or want, just as compensation reservoirs are regarded by the inhabitants of cities who have constructed them to replenish the streams which their thirst would otherwise drink dry.

No man of ripe years and sound mind, acting freely and with eyes open, ought to hinder, with a view to his advantage, another from money-making. The instinct of self-preservation should prompt the provision for the possible future need, as it does with various species of insect and animal life. Notice, for instance, the bee spending the livelong summer day in collecting and hoarding up the golden sweets of a thousand flowers, that when autumn comes he may take a rest and enjoy the fruits of the summer's toil. The power of producing wealth in any form is the power of producing subsistence. The accumulation of it is prompted by the dictates of humanity as well as approved by the science of political economy, and in proportion as this is accomplished by dentists will dental art be looked up to and respected, and we will be summoned forward to a higher and more dignified rank. I urge, then, a generous applause for the enhanced prosperity of my neighbor dentist, because I am sure it means increased respect for dentists and increased attention to dental matters. The dead-level of average comfort, always too low for the man who is intelligent, industrious, and self-respecting, is not enough for the future dentist.

The essential thing for the highest good of a people is to have an absolutely sound system of finance. The late flurry and repeal of the Sherman purchasing act illustrates this in state matters. The laws governing finances are the very basis of a nation's prosperity. No clique can subvert the immutable laws that govern the world's exchanges. The laws that govern individual financiering are just as arbitrary. No professional fiat can fix the value of money or determine the value of its use, and it is idle nonsense to deride our devotion to it.

Our moralists are wont to tell us of the evils of wealth and the happiness of poverty. Bosh! We are poor as a profession, and as individuals nine out of ten to-day are of no financial account. We bear it as well as most people, but it may be safely said that the one-tenth who are credited with more or less have grown happier with each dollar they have gained. We should all aspire to freedom and independence. The country is full of the elements of wealth and prosperity. There are right ways for every dentist to get his just portion. The best means of securing a monetary sufficiency appropriate to our position in life should be sought. Our patients will be none the less grateful, and they will be all the more ready to speak the name of their dentist if he succeeds along this line Point me in Michigan to-day an active dentist of considerable means, and I will show you a man of influence among dentists, respected by them and by his patients. Perhaps it is well to encourage those who may be practicing under unpromising circumstances,—to make any one happier is kindness, truly,—but it would be a greater kindness to point the way to a competency. Among our dental demagogues are those who, striving for the bauble fame, or anxious for the good-will and maybe the votes sometime, decry or set at naught the principles here urged,—perhaps because the large majority like to hear their ways defended, and applaud at the proper time; perhaps because they think our gray matter of too limited area to retain impressions at once of dental art and modern money methods of self-protection; or perhaps, nursed on the breast of poverty themselves, they think, innocently, their pap delicious, and recommend it to all.

It is true that honesty and faithfulness in the discharge of professional obligations enforce close attention to the details of all departments of practice. It is not possible for any man to be universally apt in every department of life; but, with so much dependent upon business success, it is next to criminal negligence to give it no thought. To accumulate property is a proper safeguard against poverty. The impulse is healthful. Healthful progress lies in stimulation of this impulse up to a certain point. A general distribution of wealth gives a high average quality of citizenship and self-dependence. General net results are the touchstones in every business. To me a profit-making business possesses a great fascination, and no dentist ever yet, in private conversation, has left the impression that he was ambitionless in this respect.

If, then, dignity may be added to dentistry by the accumulation and proper use of wealth, why ignore the fact, why decry disparagingly the possibilities of financial success, why spread on the wings of dental journalism the parrot-like repetition of an ancient sentiment that has never done, and never will do, the profession any good? I venture the thought that could I to-day tell every brother dentist how to materialize five thousand dollars to his credit, I should be the most famous dentist in the world.

The business requisites for our success are just the same as for the physician or tradesman,—a retentive memory for faces and names, a straightforward but genial manner, and a great intuitive knowledge of human nature. Fortunate is he who possesses the qualifications as natural endowments, without special effort to develop them, for he who must acquire them by personal effort, after arriving at an age where their need is recognized, has indeed a task. We must deal with the dull and the bright, the slow and the quick; the impatient, critical, and morally obtuse must be met with politeness, firmness, and tact.

The importance of a thorough technical training will not be disputed. It is taken as granted that the more we know and can do, the better equipped we are. The best dentist is the one who does the most good.

Fees should be put up to the limit where the patient's receipts in future comfort, health, and appearance meet the expenditure in discomfort during the operation, or pain, or fear and money paid out on commercial terms. Thirty-one thousand persons in the United States are reputed to own more than one-half of the assessable property. Secure a practice in this class if possible, but if you are one of the few who fail, remember still to charge a good fee, and—earn your fee.

Invoice your effects as often as once a year, and compare with former years. The effect will be stimulating. You should be able to know at the end of each year what have been your personal and office expenses and profits. There is something wrong when your balance shows no gain. Look immediately for the cause. It may be a malignant growth of bad habit, hypertrophied extravagance, or an abnormal development of wants. It makes no difference what the discovery, heroic treatment is indicated. Cut down the outgo and stimulate the income. If unprofitable interests outside the office betray exaltation of temperature, try reducing with such sedatives as study and experiment. Heroic doses of earnest, sober thinking on professional possibilities will usually slow the worldly feverish pulse. Try it anyway, and try it early, for fear the breaking-down of normal manhood is threatened and may be followed by the formation of corrupt action and the sloughing away of integrity and intelligence. Many have thus with their eyes open run their mental, moral, and financial prospects upon a rock which stares all in the face.

Unbusiness-like accounts indicate loose management, and bad bookkeeping shows accurately the true condition of affairs, and so misleads. It is therefore a favorable indication when the most improved methods are used, and the books show accuracy and systematic method. Records should at a glance place us in possession of such important facts as the correct address, date, kind of operation, prognosis, amount, and time to expect payment if credit is given. The day of small things is not to be despised, and faithfulness in the performance of petty duties gives discipline and self-mastery that make it possible to rise afterward safely upon the swelling tide of fortunate opportunities. The open account is a most frequent source of loss, and its proper management in the way of giving credit and enforcing payment is of the utmost importance. No business can thrive and be obliged to charge off regularly large amounts of bad debts. If we are ordinarily alert, we should soon become posted as to the character and circumstances of those who may become, or are, our patients, and can govern the conduct of our practice accordingly. People want good service, good treatment, good results. Do not disappoint them, and then before they have had time to forget their anxiety for relief or improvement it is well to collect your bills. It is easier and more satisfactory to all concerned. The element of gratitude is soon eliminated from the average patient. It is not necessary to let a mass of accounts accumulate and outlaw. Use freely and systematically statements through the mails and by collector. Impress upon all who are inclined to test your business rules, that rules are as necessary to the success of the dentist as the banker, and success as dear. Do it kindly but firmly, and never lose your temper. Getting angry is one of the most common and useless mistakes we make. A display of anger is always a mistake ; self-control, control of speech, is the only true policy, and from many a sorrow too will it save us.

Any one who manages the affairs of life only with present gratification in view makes a mistake. The future cannot safely be forgotten. Make it the rule to exclude professional antagonisms from the sphere of private life ; stand ready for mutual good to defend in private as in public a competitor and his operations, as far as they can be made to appear right or excusable, and keep silent when this is impossible.

There is no reason why we should not be in a degree familiar with the common laws of business,—viz, notes and bills of exchange, leases, interest, collection of debts, partnership, etc. A smattering of knowledge essential to financial success can be acquired in the odds and ends of time wasted by most of us worse than foolishly.

Few of us are careful buyers. Too many allow sentiment to influence them. To buy in the cheapest market and sell in the dearest is the theory of management of progressive money-makers to-day. We should buy reliable machinery, instruments, and material, but as cheaply as possible. All manufacturers offer generous cash discounts on large sales, to take advantage of which is both sensible and profitable. Any one who has studied the business management of the average dental practice knows that four out of five are willing to pay from ten to twenty-five per cent. more for what they buy, and buy in driblets as they need it. They buy on credit at high rates, and give credit in their practice, letting accounts run six to twelve months, and often until they outlaw; thus never realizing their expectations, and often suffering bitter disappointment. He who does a cash business both ways knows what he has.

Do not use your credit to the limit. Credit may be, and is by a few, used to advantage; but the vast majority of us who are permitted to use it do so very unskillfully, making ourselves poorer by the using. To have the reputation of paying our debts, and the ability to do so, is almost equivalent to possessing great wealth.

When as a student you buy your outfit, you begin to accumulate. The dental furniture that follows, the clothing that protects you, the home you enjoy, are wealth. The winter's supply of coal, the provisions in the cellar, are wealth set apart for subsistence. Who will attempt to prove the unwisdom of providing by accumulation thus far at least? I would go further, however, and urge all to accumulate because wealth assists in the procurement of wealth, insures the satisfaction of desires, and increases the power to produce wealth and satisfy desires. In common parlance, we often speak of our knowledge or skill as constituting our capital. Superiority in such qualities may augment our income just as wealth would, but it cannot take the place of accumulated wealth when sickness or disability overtakes us.

All work, whether manual, mechanical, or mental, all effort of every name or nature, is expended directly or indirectly through the use of capital in process of bringing out or producing food, fuel, shelter, or clothing. If we recognize this clearly, and do not subsequently ignore it, it will be easy to demonstrate that the dignity of our profession is not lowered by proper attention to business details.

Many affect to consider it degrading to look upon the dentist as a producing machine; and it may be so, as any conception is which forgets that the dentist is first of all a man, and that he eats for his own sake as does a king. The widespread inclination to spend freely in riotous living grows out of easy recognition of the truth that wealth exists only for consumption. It plainly does not perform its function when hoarded; but the possession of capital means the possession of productive resources, and this means much. The dentist with a well-equipped office costing a thousand dollars or more is certain of larger returns than if he has only the handful of tools of the itinerant. We save that we may have more to enjoy, to consume. Saving as a mere end in itself is penuriousness, a most demoralizing passion. But our efforts to produce are so inefficient unless aided by capital, which is impossible without previous saving, that he who does not save consumes his seed-corn which is the hope of next year's harvest.

Men in general prefer a future to a present good only when it is larger in amount. To provide for old age or possible accidents may be a sufficient motive in some cases, but most men will not save unless the goods saved will bring an increase. It is therefore necessary to any extended saving that the conditions of profitable investment be provided, and opportunities must be readily accessible. However, there is great danger when, with office and home provided for, we begin to look about for other investments. The few who ever advance thus far are likely to take a false step now. The lack of early business training, the close application to office details, the lack of contact with the commercial world, make us, as a rule, the easy prey of the sharper. Our sources of information being unreliable, our judgment cannot be good. Desiring permanent prosperity, we should avoid speculation as if it were poison, and turn our back on plausible rascals who promise fabulous returns on small ventures. For one winner in lotteries, speculations, schemes, etc., there are a thousand losers. The winners make a great show of their good fortune, the losers are silent. The man who can save a dollar a week or more by the proper selection of an investment, must be relieved proportionately of anxiety concerning the future.

Saving may become—in fact, does become—a habit with most men who acquire wealth ; but it is a safe habit, for where you find one miser, there may be found ten thousand victims of the drink habit. There is a pleasure in it wholly unknown to the careless and unthinking who never do any figuring on their own affairs. Saving means better clothing, better food, better shelter, and with these better chances for health and life and life's enjoyments. The habit will grow and displace other habits, and thrift once acquired will never be surrendered for the trivial. The habit, encouraged, will soon become a joy.

In popular language, any outlay of money that brings fair and reasonable returns in money is called a good investment. The nature of our business, unfortunately, makes accumulation of large sums for investment exceptional. Investments that eliminate, as far as possible, the necessity for close attention or the risk of reinvestment, will prove the most favorable to us, because we need to be as free as possible from distracting thoughts. So long-time loans on real estate mortgages, while they are made at lower rates, will be found more satisfactory than short-time loans on promissory notes or chattel mortgage collateral. So investments made in real estate, requiring little attention, give less trouble than investments made in commercial concerns, in which, to be safe, attention to details cannot be ignored. Any one who has observed the rapid growth of our cities should appreciate the fact that values are almost sure to increase. Real estate in city, timber districts, or mining regions has always been the most steady and certain investment to be had. To be able to buy, and to know when and how to buy, is worth some study. If you lack confidence in your judgment, seek an opportunity to enter a syndicate in which you may become a partner *pro rata* of those who often control your local world of finance, and reap the profits which attend the sagacious employment of large capital at propitious junctures. The advice given Benjamin Butler at the beginning of his career will apply as well to-day: "Buy land; if you are doubtful of your judgment, buy at auction, because in this way you cannot lose much, for you will have to pay but a trifle more than some one else is willing to pay."

A brilliant dash and display does not promise wonderful results to the experienced. Be content to creep before you walk; strive to know how, and trust to established rules and persistent effort. If mistakes occur, profit by them; this is the law of progress. Great achievement in any realm is the consummate result of years of struggle. Ambition, persistence, self-reliance, and know-how are the foundations of permanent success.

There will never be any bounties, subsidies, franchises, or government grants to dentistry. It is doubtful if any of us now living will ever see one dentist appointed to service in the army or navy. A few may profit from patents, but the number will be small, and although we practice, in a measure, under state regulation, the benefit we get from this protection is offset by the extra amount we pay for protected supplies.

To those who properly understand its advantages, life insurance should be considered a valuable privilege of providing for dependent ones in case of death. In recent years it has taken a stronger tone even, and is now looked upon by many right-thinking men as a duty. Has a man the moral right to jeopardize the living of his family when protection is so cheap? Insurance is certainly one of the valuable factors in our economic civilization.

Human nature being as it is, scarcely one in a thousand will make adequate provision by constant voluntary deposits in a savings bank; yet banks are worthy of patronage, because they are handy and pay you a fair rate of interest while you wait. The man who has his savings drawing interest in some safe institution is ready for an emergency. The hardship entailed by every sudden demand emphasizes this point: it is well to keep a cash balance to one's credit, or securities easily convertible into cash. The chance of a lifetime may slip away because we do not have a little ready money to take advantage of it.

A good and safe place to invest small sums may be found in our building and loan associations, especially to those who would enjoy that most hopeful of hopes,—the hope of a home,—but whose accumulations forbid the immediate realization of it. The monthly deposits become immediately productive, which is always encouraging in any venture, and fair returns may be expected. It is safe to predict that not a dentist in the land need be homeless if he will follow so sure a road to so good an end. As a class we are among the least able to pay rent, and it is a reflection on our financial acumen that the necessity is so universal. There is no tax more onerous upon us than this monthly exaction for the privilege of shelter; nothing more destructive of thrift than the unceasing demand for tribute for a place in which to eat and sleep.

It may be said that there is no precedent for urging such views upon an enlightened profession. It may be objected that such thoughts are not professional orthodoxy. Whether this is granted or denied, the financial phase is not without interest to all. Nine-tenths of us are on a level with the wage-earners,—a semi-genteel proletariat as it were. Our income is entirely dependent upon steady employment and good health. "Out of a job," no income; sick, no income. Wages cease at death. The family must do without it. Doing without it represents the loss of their entire capital. In many cases it means misery. Why should we, coming in contact daily with wealth, manage to be deprived of it? In the confidence of young manhood and sturdy health we may court the sternest activities and rejoice in constant operating, but there surely comes a time when the eye dims with advancing years,—when ambition flags.

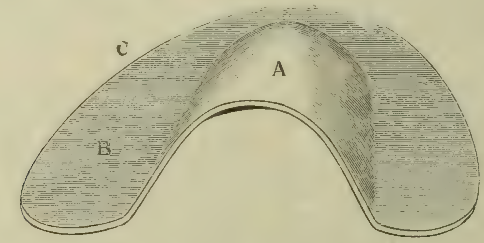
The road to success is narrow and somewhat difficult, but it is open to all who love the prospect and are willing to comply with the requirements. The degree of ability, industry, integrity, and management which characterizes our conduct indicates the degree of success we may expect to realize. Circumstances have never occurred, never will occur, that will permit such a career as that of Mr. Rockafeller or Mr. Carnegie, but a competency is possible to every well-qualified, conscientious, energetic dentist. A competency is not a vision of far-off wealth, to the attainment of which we must not even dream.

NEW BITE-TAKING MEANS AND METHODS.

BY W. STORER HOW, D.D.S., PHILADELPHIA, PA.

THAT part of the process of dental prosthesis which has perhaps made the least progress in modern movements toward improvements in dental methods and means may well be said to be the "taking of the bite." This common phrase is rather rudely descriptive of the main thing to be done, but it is specific and clear to the mind of every practitioner, although not inclusive of the incidental accompaniments of the complete process of preparing counterpart studies of the designed denture.

FIG. 1.

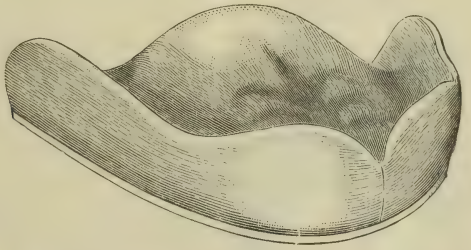


Since writing the article on "Plaster Prosthetic Models," published in the DENTAL COSMOS for September, 1888, copied, with its illustrations, in the leading European journals, and manifest in several text-books, thoughtful attention has been given to the bite problem in general, and its satisfactory solution may be deemed to have been fairly worked out.

In Fig. 1 is seen an upper bite-plate of suitable thin metal, having a palatal portion A, a plane portion B, and a contoured edge or border C. When a full upper denture is contemplated, the bite is at once taken by placing on the bite-plate, Fig. 1, a sufficient quantity of warmed beeswax to secure a completely good impression, and at the same time afford material for modeling the labial and buccal surfaces in a suitable manner to produce the proper facial expression.

The bite-plate here exhibits its novel and useful functions in enabling the dentist to readily lengthen or shorten the bite, and also adapt the bite-plane B to the lip-line, as well as to the occluding lower teeth. When this has been carefully done and the mass removed from the mouth, the appearance will approximate that of Fig. 2. If the bite then requires an increase of length, the bite-plate is held a moment over the Bunsen flame, when it will fall on a paper napkin held in the hand. It is then covered with a thin sheet of wax, replaced on the modeled wax, trimmed with the wax-knife along the contour border C, again put in the mouth, and conformably remodeled and readjusted. The quickly transmitted heat of the metal bite-plate permits facile changes in occlusive adaptation and contour, without disturbance of the fit of the impression portion of the wax, an advantage of real consequence and value.

FIG. 2.



If upon further study it is desired to shorten the bite, the mass is removed from the mouth, the plate quickly warmed over the Bunsen flame, all replaced in the mouth, and the patient instructed to close the teeth firmly on the bite-plane, which, while accurately maintaining the plane of the occluding teeth to which it has been conformed, will at the same time cause the softer wax immediately in contact with the plate to gradually yield until the bite becomes suitably shortened.

FIG. 3.

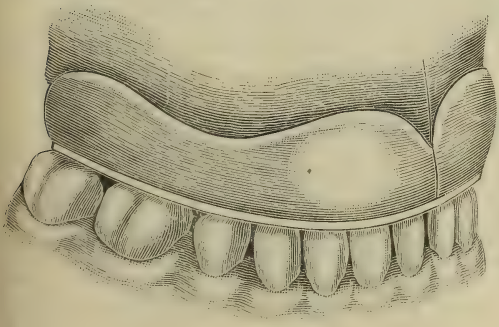
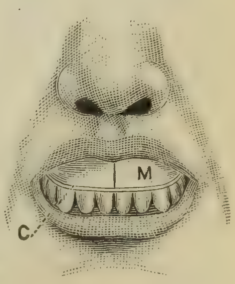


FIG. 4.



In this connection it is important to note the functional difference of this metal bite-plane from the common wax plane, which yields and is indented by any considerable pressure of the occluding teeth; whereas, in the present instance, so soon as the wax has cooled to a slight stiffness, the patient is directed to press the teeth hard on the bite-plate (see Fig. 3), and the result is a bite-gauge identical in length with that which the finished denture will have under the ordinary pressure of the closed jaws. Many of the usual disappointing discrepancies between the common soft wax bite-gauges and the resulting defectively articulating dentures may now be avoided.

FIG. 5.

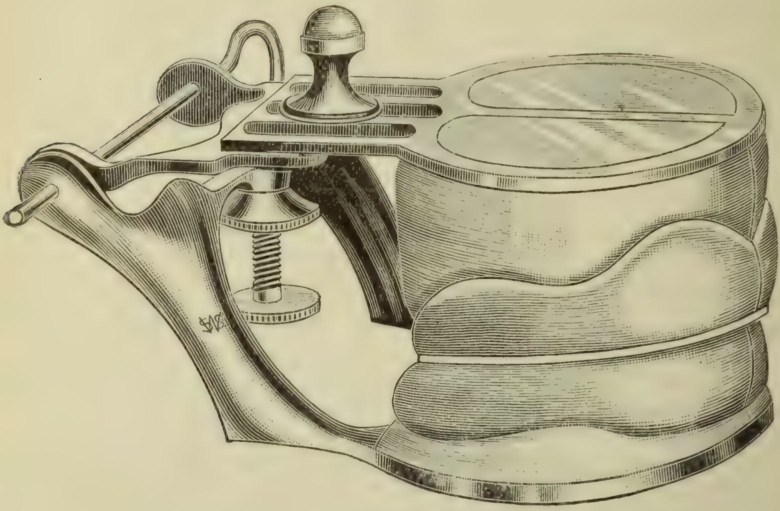
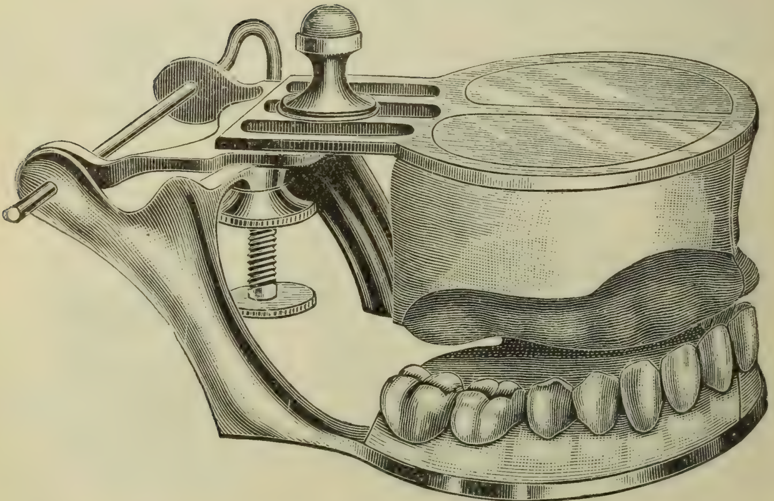


FIG. 6.



The smooth and hard surface of the bite-plane B fixes a constant and firm limit to the bite-length while allowing the utmost freedom of lower jaw movement in occlusion during the adjusting and modeling processes to secure a natural oral and facial expression, with a proper lip line as indicated in Fig. 4. This having been accomplished, a roll of warmed wax is placed on the under side of the bite-plate, which is replaced in the mouth, and the patient, while the previous process was going on, having been instructed and practiced in the correct manner of closing the jaw, the head being thrown back to bring the face horizontal and the jaw held as far back as possible, the teeth are pressed through the wax onto the bite-plate, and kept there while with the finger the labial and buccal portions of the soft wax are pressed in upon the natural teeth. The mass is then carefully removed from the mouth and kept in safe readiness for transfer to the plaster model when obtained from the plaster impression, and it is unnecessary to dwell upon the advantages of securing a certainly correct bite at the time of the sitting secured for taking the plaster impression. Fig. 5 shows a bite thus taken and transferred to the model set in an articulator, and Fig. 6 represents the correct bite so obtained. This novel bite-plate provides for the taking of a very short bite as shown in Fig. 6. In fact, the bite-plane B may rest directly upon the gums, and the under teeth strike the plate, yet the rigidity of the metal plate is such that the wax impression and modeling will not warp in the adjusting, shaping, and removing manipulations; whereas, by the old mere wax methods a trustworthy very short bite is impracticable.

FIG. 7.

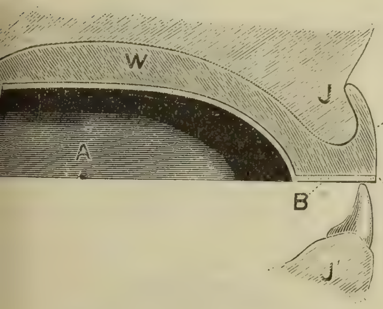


FIG. 8.

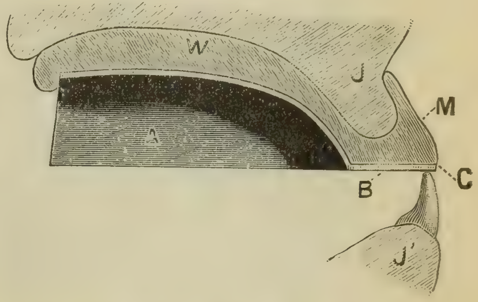


Fig. 7 exhibits a median line section exemplifying the relations between the bite-plate A, B, C, the wax W, the modeling M, the upper jaw J, the lower jaw J^1, and the occluding lower teeth. Obviously, by simply first warming the bite-plate and then while in the mouth sliding it suitably forward, the contour modeling may be done to produce a result like that of the median line section, Fig. 8. In any given case the bite-plate border C can be easily cut or filed to suitably modify its contour to the desired configuration of the modeling, although it is best to have at hand several sizes of the bite-plate to use without delay for adaptation.

By cutting away the wax W to expose the upper anterior gum G and ridge-crest from cuspid-place to cuspid-place as shown in Fig. 9, the space between the bite-plane border C and the ridge-crest may be accurately gauged to determine the availability of artificial teeth having cross-pin, or up-and-down pin bite length; it being a matter of importance at the outset to decide the question of permissible bite-space between the gum crest and the down-pin border of the teeth-backs. The overbite or lap of the upper oral teeth over the incisive edges of the lower teeth may then be provided for by means of some softened wax on the under side of the bite plane; modeling some wax over the anterior gum and edges of the lower teeth as shown in Fig. 10.

Bite impressions for partial dentures, however irregular the jaw surfaces or occlusive dispositions, can be most conveniently and correctly produced by means of the modified bite-plates herein shown and described. In some instances modeling compound, plaster, or moldine may be advantageously employed instead of wax.

FIG. 9.

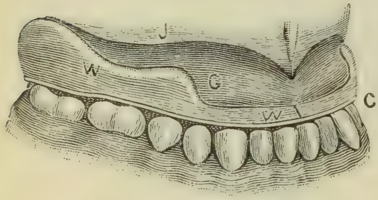
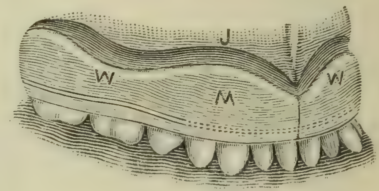


FIG. 10.



For partial upper dentures, sections of the bite-plate are with plate-nippers cut out as at EE, Fig. 11, and the bite taken in the way previously described.

The lower bite-plate, Fig. 12, is of like character with that of Fig. 1, the lingual portion D being designed to approximate the lingual conformation of the lower jaw, while the bite-plane B and contour border C have the bite-taking functions of the upper bite-plate. For partial lower dentures, sections may be cut out as at EEF, Fig. 13, to permit the passage of the remaining natural teeth through the bite-plate, the intermediate planes of which can be shaped to conform to any plane of the occluding upper tooth or teeth.

FIG. 11.

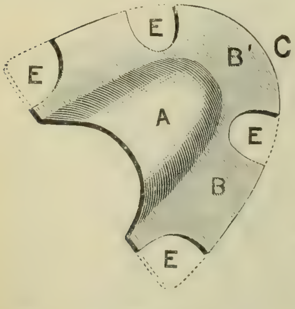
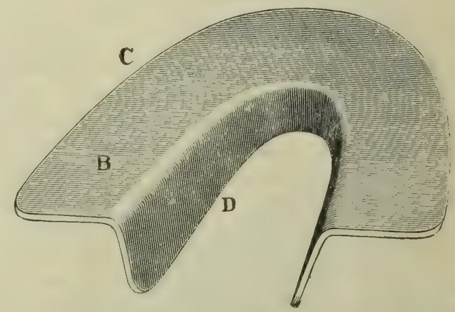


FIG. 12.



When either jaw is a very flat one, it is best to take first on the bite-plate a good impression in wax, and then with a spoon spatula scoop out about an eighth of an inch deep over the surface of the impression, smear over it some rather thick mixed plaster, and take another complete impression. This, when allowed to get quite hard and suitably trimmed at its borders, may be often replaced, and readily retained in the mouth during the modeling and adjusting process requisite in obtaining the bite by the methods already described. In fact, this is the preferable procedure for bite-taking in the greater number of full-denture cases, since the plaster contact with the jaw is unvarying and retentive, while the bite-plate is adjustably movable on the intermediate modelable wax. There is, furthermore, the certainty that the plaster bite impression will fit the plaster model; in fact, it may sometimes supersede the plaster impression if found in some particulars the better. Thick-mixed plaster may be piled on the under surface of the bite-plane, and the occluding surfaces of the under teeth be perfectly copied for reproduction in fusible metal if desired.

If the maxillary vault is a very low one, an upper bite-plate with its plane B resting on a flat block may be struck with a hammer on its arch A, Fig. 1, to suitably depress it to conform to the low vault. To suit a narrow high vault, set the buccal edge on a block or anvil and strike with a hammer on the opposite edge to contract the wings and raise the arch A.

FIG. 13.

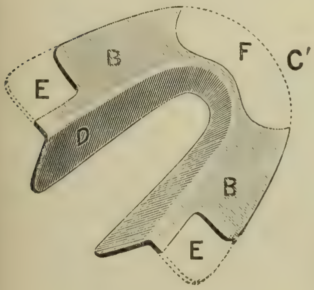
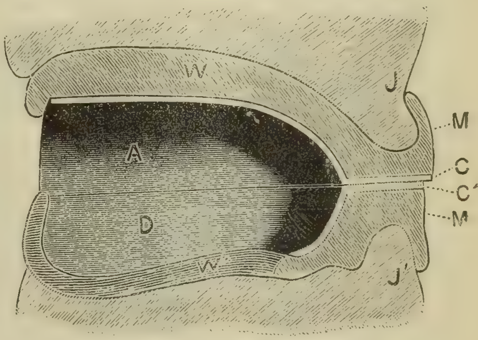


FIG. 14.



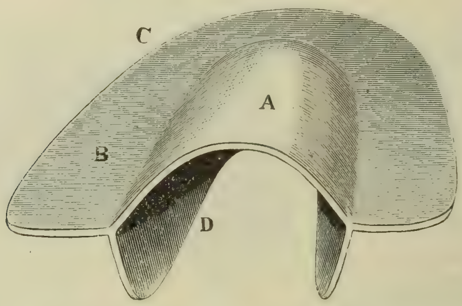
In taking the bite for a full denture, the upper and lower bite-plates are used as already described, and the facility with which the modeling, contouring, lip-line, and relative upper and lower teeth lengths may be determined will agreeably surprise experienced prosthetists accustomed to the old wax-model methods. The upper and lower metal bite-planes, during the process of adjustment, perfectly maintain the bite-length, yet slide freely upon each other during the masticatory movements of the jaw requisite in repeated trials to determine the correctness of the modeling and the bite-lengths. When that has been satisfactorily accomplished, the patient is instructed to properly close the jaws and hold them firmly closed while the median line mark is made, and the lips on either side held apart while the usual cross-lines are scratched over the modeling and the two bite-plate edges somewhere near the molar regions on both sides.

Both models are then removed, the bite-planes dried, slightly warmed, placed upon each other so that the median line and scratched marks shall exactly coincide and be held so, while with a stick of melted hard wax the inside edges of the bite-planes are stuck fast to each other. The correctness of the bite may be verified by replacing the united bite-plates in the mouth, distending the lips and cheeks with the forefinger to free them from entanglement with the plates, and making careful renewed observations to be sure that the bite is correct. The median line section, Fig. 14, shows such a bite.

In the duplex bite-plate, Fig. 15, the two plates Figs. 1 and 11 are made as one; and with a full understanding of the processes previously described, it may be in like manner used to take the bite for a full upper, or full upper and lower denture, as the case may be. Fig. 5 serving as an example of the taken bite in either case.

The duplex bite-plate has an occasional supplemental use for taking simultaneous impressions of the teeth in both jaws for regulating purposes; when it is desired, for instance, to make a vulcanite or cast-metal plate, a portion of which is to cap the molars or other teeth. In such a case the bite-plane is to be cut away to allow the passage of the anterior teeth, leaving such parts of the bite-plane as may be required to rest upon the teeth which are to be capped. The wax on the upper and under side of the remaining portions of the bite-plane will insure in the articulator models a representation of the occluding surfaces in their exact relations to each other, and separated by the desired thickness of the vulcanite caps of the regulating fixture.

FIG. 15.



In some instances, as when the vault is very high, the central part of the palatal portion A is slit and bent wide open, or with plate nippers suitably cut to allow the pressing up of the wax by the forefinger, to get a good impression of the deep vault.

These bite-plates provide for, and emphasis is laid upon the importance of procuring, a complete and perfect impression, which will fit the plaster cast taken from the plaster impression and thus insure the correctness of the bite as reproduced on the articulator. (See Fig. 6.) In some instances modelling composition is used instead of wax. In every case the tendency to redundancy of labial and buccal material in the modeling is to be thoughtfully avoided, as may well be done since the good palatal fit will serve to retain the plate even when the labial part of the maxillary ridge is not covered by the modeled wax.

It is best to first take the bite, and follow with the impression, which is usually taken in plaster and attended with more or less discomfort to the patient.

Not the least of the notable excellences of the new bite-plate is the certainty that after the modeling has been done (see Figs. 3 and 4), the patient will bite through the soft under wax until the teeth strike and are stopped by the bite-plane, thus invariably and accurately gauging the teeth length. Indeed, both the means and the methods are submitted in the confidence that time and practice will insure their general approval and adoption by the profession.

ANOTHER METHOD OF GOLD FILLING.

BY J. W. EGGLESTON, D.D.S., RICHMOND, VA.

HAVING read carefully the articles on gold filling which have appeared from time to time in the DENTAL COSMOS and other journals, from those of Dr. Ottolengui, on the extreme side of cohesive gold, to those advocating the other extreme of old-fashioned, flat-surface, non-cohesive fillings made on the wedging principle, I am constrained to give the method I use, but at the same time disclaiming originality on my part. I frankly admit that excellent results are attained by both methods. The results obtained by Dr. Ottolengui's methods are not only beautiful in the extreme, but the great strength of his methods of retention is at all times geometrically demonstrable, and yet his system leaves much to be desired. In the first place, by his methods an extreme display of gold is unavoidable, which is shocking to good taste. Secondly, the sacrifice of enamel is excessive, and to be condemned if by any other good plan it can be avoided. And thirdly, whatever may be the result in the North, the presence of such large masses of gold so near the living pulp will in this latitude almost always result in inflammation and death of that organ.

I have no criticism to make on the laboriousness of extensive cohesive-gold work, because I hold it to be the duty of the dentist to consider only the good of his patient, and then to make that patient pay for services rendered, whatever they may be.

In the hands of less skillful operators (and, unfortunately, all cannot become Ottolenguis) cohesive gold is very difficult to work in many cases, and frequently fails to conform to the minute irregularities of floor and wall, and even when inserted by fairly good operators, and successfully as far as tooth-preservation goes, becomes in time unsightly. Of course this should not be a conclusive argument against its use by good operators, but is an argument in favor of a more tractable material, if such can be found. In poorly calcified teeth its incompatibility is so marked as to furnish large stores of ammunition to the advocates of the new departure, who claim that gold is an improper filling-material under all conditions. On the other hand, non-cohesive gold possesses the peculiar power of being easily adapted to all irregularities of floor and walls, no matter how minute, but of being used under thin walls of enamel so perfectly as to support it from crumbling, when if any harder material were used it would soon be gone. Excess of undercut, or overhang, if you please, makes little difference in its use, as its lack of elasticity and the sliding of its laminations on one another, make its use easy even in extreme cases of this kind. And yet it by no means comes up to modern needs, because it cannot be contoured without annealing, and then it is no longer non-cohesive gold ; its surface takes on only a moderate degree of polish, and soon loses that ; it emphatically demands support from walls on all sides, and it will not stand being picked at with pins and needles, which is a very common female vice.

I presume few intelligent dentists will deny that the great desideratum is a filling-material combining all the good qualities of both kinds of gold. This is easily attainable by simply using both in each filling. I am not one of those who claim to be able to fill the bottom of a cavity with non-cohesive and then finish with cohesive, and get cohesion between the two. I have often heard this claimed, but I cannot do it. The course I pursue is this : I get a good honest undercut all around if I can, and on two opposite sides anyhow. If the cavity is in an incisor, and both labial and lingual walls gone, I cut a good groove at the cervical end of the cavity, and make a deep pit toward the cutting-edge, and try for some little undercut at the cervical angles. I begin with a ribbon made by folding three or four times quarter or one-third leaves of No. 4 non-cohesive foil, tucking it in snugly, but not condensing at all, and letting each fold extend somewhat above the surface of the cavity, but not to such an extent as I would do if I intended using non-cohesive entirely.

When I can tuck in no more, I take a nearly straight excavator with a sharp edge, so as to cut through and not carry gold before it, and with it make holes to the bottom of the cavity, at an angle of say forty-five degrees to the floor, and in the direction of deepest undercut, making never less than two of them in opposite directions, and sometimes as many as four. I then with very small serrated points fill these holes, using very small pellets of cohesive gold, and then building from one to the other for a foundation, leaving the non-cohesive in contact with all the walls up to their edges. The gold packed in these holes acts more after the manner of the rivet than that of the wedge, and seems to, and I believe does, button out in the mass of non-cohesive gold, and not only drives it sideways into every possible irregularity, but forms an unyielding foundation for any amount of contour desirable in most fillings, and never rocks or moves, as cohesive gold so often does when packed in naked dentine. As soon as all the holes are full I proceed to build from one to the other, and on this foundation do not hesitate to build either rounded or contoured fillings. Fillings thus made retain all the polish and hard surface of cohesive work, and all the clearness and absolutely water- and air-tight qualities of the very best non-cohesive ones ; and even to a greater degree than can result, in my opinion, from any amount of condensation that can be put on all non-cohesive gold, and at the same time is as strong in all ordinary cases as all cohesive. There are, of course, some cases that call for the utmost strength and hardness, and which must be filled with cohesive alone. These should be filled as Dr. Ottolengui so clearly describes, for to my mind his articles leave nothing more to be said about cohesive-gold filling.

I have tried to avoid all ground of controversy, and to that end have not even stated what sort of force I use. I consider it immaterial whether hand-pressure or any of the different mallet-forces are used. Let each decide for himself what best suits his hand. I have my particular favorite, of course, but so has every one else. My only object is to benefit those who are halting between two opinions and liable to fall between two stools, and those who know only of the excellences of one of these forms of gold and are ignorant of the virtues of the other. I despair of convincing the followers of the brilliant and able Dr. Flagg that this method fulfills all the conditions of the new departure without leaving the teeth dependent on the short-lived plastics, *but it does*.

CORRESPONDENCE.

AN OPEN LETTER TO DR. NORMAN W. KINGSLEY.

MY DEAR DOCTOR:

I can assure you that I do not hold myself responsible for what a reporter may say I said at a dental society meeting.

In the report of the discussion which followed the reading of Dr. Marshall's excellent paper I am made to say the reverse of what I did say in regard to the question of cleft palate and hare-lip.* The report of my remarks in the discussion of Dr. Marshall's paper is defective throughout. Permit me to call your attention to a paper on this subject contributed by me and published in the Transactions of the Ninth Session of the International Medical Congress, vol. v, page 631. The paper is illustrated with cuts precisely like those in your article of the July COSMOS.

Most respectfully,
JOHN J. R. PATRICK.

BELLEVILLE, ILL., July 26, 1894.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

THE thirty-fourth annual session of the American Dental Association was held at Old Point Comfort, Va., commencing Tuesday, August 7, 1894.

FIRST DAY—*Morning Session.*

The association was called to order at 11 o'clock; President J. D. Patterson, of Kansas City, in the chair.

The session was opened with prayer by Rev. Dr. H. C. Cheatham. Dr. H. Wood Campbell, president of the Virginia State Dental Association, delivered an address of welcome, which was responded to by the president.

After the disposition of routine business, a committee, consisting of Drs. H. A. Smith, Louis Jack, and C. E. Esterly, was appointed, at the suggestion of Dr. J. N. Crouse, to examine, in conjunction with a similar committee from the Southern Dental Association, and report upon the affairs of the Dental Protective Association. This committee reported, at a later session, through Dr. Smith, that it had examined the accounts of the association referred to, and they found the funds received fully accounted for and the affairs of the association economically administered. The greater part of the money on hand was invested in mortgage securities. Dr. Crouse, its manager, was giving his time and services without compensation.

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*See DENTAL COSMOS for May, 1894, page 388.—ED.

On motion of Dr. A. W. Harlan, Chicago, the secretary was directed to send a cable message of fraternal greeting to the American Dental Society of Europe, in session at Geneva, Switzerland.

Dr. J. D. Thomas, of Philadelphia, offered a resolution for the appointment of a committee of nine to take into consideration and report at this meeting measures for the proper celebration, in December, 1894, of the fiftieth anniversary of the discovery of anesthesia by Horace Wells. The resolution was adopted, and the following committee was appointed: J. D. Thomas, Philadelphia; Thomas Fillebrown, Boston; J. Taft, Cincinnati; James McManus, Hartford, Conn.; W. H. Morgan, Nashville; W. C. Barrett, Buffalo; A. W. Harlan, Chicago; H. J. McKellops, St. Louis; Thomas E. Weeks, Minneapolis.

The committee at a later session presented the following report:

MR. PRESIDENT AND GENTLEMEN:

Your Committee upon Anesthesia would report that they have agreed upon the following motions:

First. That the fiftieth anniversary of the discovery of anesthesia by Horace Wells should be properly celebrated by the dental profession of America.

Second. That the celebration should comprise the presentation of two papers: one upon the "History of the Discovery of Anesthesia," and the other upon the "Application of Anesthesia to Surgery and its Benefits to Mankind"; and that Dr. Thomas Fillebrown, of Boston, Mass., be invited to present the paper upon the "History of Anesthesia," and that Dr. J. E. Garretson, of Philadelphia, Pa., be invited to present the one upon the "Application of Anesthesia to Surgery."

Third. That a banquet be given in honor of the event, at which prominent gentlemen shall be invited to make addresses, and that the papers and addresses, properly edited, shall be compiled and preserved in a memorial volume appropriate to the importance of the occasion.

Fourth. That after the claims and advantages of the cities of Hartford, Boston, Washington, New York, and Philadelphia had been presented and discussed, Philadelphia was unanimously selected as the place of meeting.

Fifth. That there be three committees appointed: an organization committee of nine, an executive committee of eleven, and a general committee of fifty.

The following gentlemen were nominated upon the several committees:

Committee upon Organization.—J. D. Thomas, Jas. McManus, H. J. McKellops, Thomas Fillebrown, A. W. Harlan, Thomas E. Weeks, J. Taft, W. H. Morgan, W. C. Barrett.

Executive Committee.—J. D. Thomas, E. T. Darby, S. H. Guilford, D. N McQuillen, E. C. Kirk, Louis Jack, C. N. Peirce, Philadelphia; A. L. Northrop, Wm. Carr, New York; H. B. Noble, Washington, D. C.; Jas. McManus, Hartford, Conn.

General Committee.—Dana W. Fellows, Maine; Jas. Lewis, Vt.; J. L. Williams, R. R. Andrews, Mass.; E. D. Gaylord, Conn.; C. A. Brackett, R. I.; S. B. Palmer, S. G. Perry, O. E. Hill, W. W. Walker, New York; R. M. Sanger, C. A. Meeker, N. J.; C. R. Jefferis, Del.; J. A. Libbey, W. H. Fundenberg, Penn.; B. Holly Smith, M. W. Foster, Md.; J. H. Moore, Va.; V. E. Turner, N. C.; T. T. Moore, S. C.; J. H. Coyle, B. H. Catching, Ga.; C. P. Robinson, Ala.; Geo. B. Clements, Miss.; G. J. Friedrichs, La.; W. R. Clifton, Tex.; A. H. Fuller, J. D. Patterson, Mo.; A. O. Hunt, Iowa; C. M. Baily, Minn.; T. W. Brophy, G. V. Black, G. H. Cushing, Ill.; S. B. Brown, Ind.; J. S. Cassidy, F. Peabody, Ky.; J. Y. Crawford, H. E. Beach, Tenn.; G. L. Field, Mich.; H. A. Smith, C. R. Butler, A. F. Emminger, Ohio; A. H. Thompson, Kan.; A. W. Nason, Neb.; G. H. McCausey, Wis.; W. J. Younger, C. L. Goddard, E. L. Townsend, Cal.; Geo. H. Chance, Oregon; W. E. Burkhart, Washington.

All of which is respectfully submitted.

The report was adopted.

Dr. McManus called attention to an article in the *Century Magazine* for August, giving an alleged history of the discovery of anesthesia, in which no mention is made of Dr. Wells's work, the entire credit being given to another. To counteract the false impression thus attempted to be created, Dr. McManus asked the association to re-adopt the resolutions on this subject which it adopted in 1864, after a congressional investigation had decided that to Horace Wells alone was due the honor of the original discovery of anesthesia. The matter was postponed for a more definite presentation, and at a later session it was again taken up and the following resolution, offered by Dr. McManus, was adopted:

WHEREAS, Papers printed in the magazines of the day are calculated to mislead the public as to the facts in regard to the discovery of anesthesia;

Resolved, That the American Dental Association places itself on record, as it did in 1864, by affirming that the late Dr. Horace Wells, of Hartford, Conn., is entitled to the honor and credit of the discovery. The justice of Dr. Wells's claim was established by an official investigation before a committee of congress. The testimony taken at this investigation is printed in a work on "Modern Anesthesia," published in 1859 and 1867 by the late Hon. Truman Smith, United States Senator from Connecticut.

Dr. J. N. Crouse made a statement in regard to the Dental Protective Association, in which he expressed his expectation that the case with the International Tooth Crown Company will be argued in October in Brooklyn.

The president, calling Vice-President J. Y. Crawford to the chair, then read his annual address, of which the following is an abstract:

Recalling briefly the importance of the annual meetings of the association, and the place accorded to it among the potent factors of advancement, Dr. Patterson referred in a feeling manner to those members who have answered their last roll-call.

Passing to a consideration of the practical needs of the association, he thought it could be truthfully said that as a body it had not enough of that enthusiasm which creates a moving force for progress such as should be expected in the national organization of a profession having aims so high and duties so necessary for the welfare of the human race. A placid indifference is upon our body politic. It is no new disease in an association of this kind, and he offered no new remedy, simply calling attention to what history and experience have taught to be the life of such an organization. "The life of an individual is a miniature of the life of a nation." Individual professional life is always indicative of what the professional whole will be. The first step in advancement must always be born of individual worth. The careful student, the faithful worker, the enthusiast makes the whole profession indebted to individual worth and force. Our association meetings are led and electrified by a few, and out of their work has come all our advancement. How shall their number be increased? It seems evident that it can only be by strenuous self-culture. If we expect success we must first put ourselves in a condition to merit it, which can only be done by sacrifice. "The worth and truth that come without much seeking, without self-denial, without mind-labor or hand-labor, is intangible; it will fail you."

The too prevalent idea among young men is that individual power is given only to the few, when it *is given to every one who works for it.* "The temple of knowledge (which is power) is in our very midst. Any one may enter it who chooses." If any one doubts that a strictly dental field brings to him sufficient scope for high mental activity, he must remember that a liberal profession embraces all the realms of science and art. There is no department of science where investigation will not improve the dentist as a dentist and as a man. There can be no error here unless it be the error of half-learning, of superficial science. This is always nugatory, and brings but ephemeral reward.

Self-culture and self-reliance are not the whole battle. Our knowledge must be well directed in associated effort. Our association must have discipline. The causes which result in progress must be *instituted.* They will not institute themselves. The plan of dividing the work into sections is in many ways admirable. It fails because so few of the members of the section assist in the work. We hear from the enthusiastic men each year, but new talent lies undiscovered. The only performance which seems to be a law is that your president shall deliver an annual address. · It would be well if every member could be compelled to be in the position of the president, to be assigned to certain work, his membership obligating him to report at each annual meeting. Progress comes, if it comes at all, as the result of antecedent causes—first, in self-culture; then in organized associated effort. It is not the result of destiny, is not erratic; nor is it providential.

In the proposed revision of the constitution, a "supervisory committee of work" is provided for, with clearly defined duties looking to more perfect scientific work, which seems a most admirable innovation. Other recommendations of the committee having this revision in charge are chiefly designed to subserve the time of the association, more especially that taking the business routine out of the regular sessions. The amendments suggested are all in the line of *instituted* means for progress.

Commendable activity and improvement have been shown during the past two years in what are usually deemed the chief forces in dental education—the dental colleges, dental literature, and dental legislation. This association has ever looked upon them with fostering care and interest. In 1892, the committee appointed to consider the suggestion in the president's address that means be adopted whereby a certificate of registration issued in one state under proper qualifications should be honored in other states, reported that uniformity of requirements would necessarily result in "leveling downward." The committee did not, however, satisfactorily prove its statement. In the proper adjustment of this matter no man and no state is asked to "level downward," for there is no plane to rest upon save that which is lawful and right for every man. Therefore your attention is again called to this subject, in order that you may offer some fitting recommendation for the solution of the difficulty.

The address then referred to the World's Columbian Dental Congress, which, though not without faults of crudity, natural to a first attempt on so large a scale, was yet so great in its accomplishment that for years its echoes will not cease to sound in our ears lessons in knowledge, in fraternity, and praise for the men upon whose shoulders pressed the burden of responsibility.

Whatever of success comes to this association by instituted and determined effort, while the scientific should ever be foremost, the ethical must not be forgotten. Men who receive a college education, whose fitting for practice is of the best, and who then betray their promises, to become a drag upon professional purity, reputation, and advancement, are *anarchists*, and should be treated as such. No line too strict can be drawn upon this subject. Rather than abolish the Code of Ethics while such tendencies prevail, its rules should be made stronger, so that within our association will be found a hatred for those who infringe upon the strictest letter and spirit of the code.

The address was referred to a committee consisting of Drs. Abbott, Wm. Crenshaw, and Brophy, to report upon the suggestions it contained.

The committee reported at a later session : First. Recommending the re-establishment of clinics in both the surgical and prosthetic departments. Second. That the registration of certificates of those moving from one state to another without further examination, while an excellent suggestion, is impracticable so long as the different state boards of examiners are chosen in the various ways in which they are at present. Third. Suggesting that the chairmen of the different sections be instructed to urge that every member of his section shall, at each annual meeting of the association, present some idea in writing, even though it be brief. Fourth. That the plan of having the business of the association transacted by an Executive Council would, in the opinion of the committee, work an injury to it, from the fact that the charge would be made that a few men managed the business without the consent of or consultation with the association as a body.

On motion of Dr. W. H. Morgan, the various items of the report were considered separately.

Dr. Cushing moved the adoption of the first recommendation.

Dr. W. Graham Smith, Lake Como, Fla. It is a well-known fact that many men experienced in the practice of dentistry, and more especially many of the young men just beginning, require the most minute details to be clearly demonstrated in order to learn new operations. He therefore felt it necessary to say something in behalf of the prosecution of clinical work by every association in the United States, whether it be the American Dental Association or the most obscure local society. There are many who cannot understand the various steps from a mere description. When he has a full demonstration, and all the details have been fully explained, a man can practically understand the subject from the beginning to the end of the operation. Few men are complete masters of their calling. A man, to achieve the highest success, must have his whole heart and soul in his work. The great mass must be shown every detail. He knew of no better way to teach these men dentistry than to let them see the operations from beginning to end.

Dr. T. B. Welch, Vineland, N. J., presumed that one reason why clinics have fallen into disrepute is because the proper arrangements for giving them with the best effect have not been made, as a rule. Commonly a number are given at a time, perhaps each in a corner of a room, and the audience crowd around so that only a few can see, and these imperfectly. If they were given on a platform, where even a few could see them clearly, they could be of great value.

Dr. T. E. Weeks, Minneapolis, described briefly a clinic given by Dr. T. L. Gilmer, of Chicago, showing a method of making gold inlays. He had every step of the process shown by models, and also had the patient in the chair. He did not actually perform a single one of the operations necessary, but by the aid of the models and the patient to demonstrate them upon, he showed the entire process in a very satisfactory manner.

Dr. A. W. Harlan, Chicago. If we adopt the recommendation to establish clinics as a part of the program, the time should be fixed for the last day of the sessions, or perhaps on Saturday, if all the time now devoted to meetings is fully occupied, so that all the scientific work may be done and still hold the crowd. But it would seem that, with more than one hundred state and local societies and regularly established clinics at all the large centers, there should be one large society which could get along without clinics. He opposes their re-establishment, because as usually conducted not a sufficient number of those interested can see them to do any good. If we had a permanent place of meeting, where proper facilities could be provided, it might be well for the association to give them ; but as the association migrates, holding its meetings at various places, there is no opportunity to carry that idea out.

Aside from this, the American Dental Association is not a kindergarten of dentistry. The speaker is one of those who value clinics, but he does not take any interest in them as a feature of this association. He has been coming to its meetings regularly since 1872, and he believes that its object should be to inculcate the principles on which practice is based rather than manipulative details.

Dr. C. N. Peirce, Philadelphia, said, it is well known that clinics were not abandoned by this association without serious consideration. He moved to refer to the incoming Executive Committee, with power to act.

On motion of Dr. Fillebrown, the whole matter was laid on the table.

The second recommendation was then taken up, and on motion of Dr. B. Holly Smith, of Baltimore, a committee of three was appointed to confer with similar committees from other associations in an effort to unify the dental laws of the various states, more especially with regard to registration. Drs. B. Holly Smith, A. W. Harlan, and J. Y. Crawford were appointed the committee.

The third recommendation was adopted, on motion of Dr. Fillebrown.

On motion of Dr. Patterson, the consideration of the fourth recommendation was postponed, to come up with the report of the committee on revision of the constitution, which had been made a special order for Thursday afternoon at 3 o'clock.

[At the special session on Thursday afternoon, the report of the committee on revision of the constitution was taken up, and Dr. H. A. Smith, of Cincinnati, moved to lay over for one year. Dr. J. N. Crouse, Chicago, moved to amend by stating as the reason that a committee had been appointed to look into the matter of combining the Southern Dental Association and the American Dental Association in one body.

The amendment was adopted, as was also the motion as amended.]

Dr. T. E. Weeks announced the perfection of the organization of the National School of Technique, with ten schools as charter members. He hoped that all the schools would soon be represented. Some five or six, in addition to those represented at the preliminary meeting in Chicago last year, have already applied for membership.

Adjourned to 8 o'clock P.M.

Evening Session.

The association was called to order at 8.30 P.M., President Patterson in the chair.

Dr. John S. Marshall, treasurer of the Executive Committee of the World's Columbian Dental Congress, read a statement of the amount of money (about $14,000) received for the expenses of the congress, and whence it came. The bills already paid and those contracted for would cause a deficit of about $1000. He brought the matter forward now so that some plan may be devised whereby more money could be raised, as he was fully persuaded that the dental profession of America would not suffer that this deficit should be left to be made up by those who had managed the congress. The bills paid did not include $4000 personal expenses paid by the members of the Executive Committee, who very generously contributed the entire sum to the congress. Of the medals gotten out by the committee, which it had been announced could be had, with the Transactions, on payment of twenty dollars, only thirty-two had been disposed of. If those who have paid the ordinary membership fee of ten dollars would come forward and pay the additional sum for the medals, the amount received would wipe out the debt. We have advertised the matter, but have so far had only three responses. It has been suggested that perhaps some of the state and local societies might contribute to the cause.

On motion, it was unanimously voted that the association contribute an additional $500 to the congress, if in the judgment of the Executive Committee it can properly be done.

[At a later session, Dr. Marshall announced that he had thought of another plan to raise the other $500, and had acted on it, with the result that he had already received private subscriptions from those in attendance on the association meeting amounting to $260. He hoped to secure the full amount before he returned home, as he would feel much better satisfied if he had the money in hand to pay any bills which may come in.]

Section I, Prosthetic Dentistry, Chemistry, and Metallurgy, was called, and Dr. R. McLean Sanger, the chairman, read a brief report, tracing the progress of the section from 1891, when two members attended its meeting, to this afternoon, when there was not enough time to consider the material presented. This had been brought about by a definite method of work, embodying a personal letter to every member of the association, asking him to participate in the work of the section.

The report then detailed the subjects to be presented under the section.

Dr. W. M. Sharp, Binghamton, N. Y., then described and explained the Sharp dental furnace, which, he said, was intended for general laboratory purposes, but more particularly for porcelain and aluminum work. It was used also for melting metals and for preparing cases for soldering. He claimed that this was the best furnace for aluminum work, because it does not heat the investment so hot as to change its shape. When the metal is melted, the jacket is lifted off, and the metal forced in with a blower at a temperature of 500° F., while in others the temperature is 1300° F. Porcelain work of any kind can be baked in the muffle, using the waste heat in a preparatory muffle. The No. 9A bellows is used, and it is not necessary to fill it till the netting is tight, so that working the bellows is not laborious work. The time for fusing various bodies varies ; some he has fused in five minutes, starting with the furnace cold. Others require as much as fifteen minutes. There is perfect combustion, so it does not matter what fuel is used.

The furnace is made of fire-clay and banded with Russia iron. It measures eighteen inches in height from table to top of flue, including iron stand. It is eight inches in diameter from outside to outside ; the tube and stand are nickel-plated. It is provided with a small shelf at the mouth of the muffle to guard against possible accidents. The jacket is of Russia iron, lined with heavy sheet-asbestos, and has on the inside a cast-iron track on which the muffle slides. The aluminum flask is of cast iron, with a disk of asbestos in the stopper to make the joints tight when casting. The doors are of cast iron, and faced with heavy sheet-asbestos so as to close tightly against the clay and prevent the escape of heat. In the doors there is a small piece of mica through which the condition of the muffle may be watched.

In reply to questions, Dr Sharp answered that he thought the compressed air which is supplied in some of the modern buildings, with a pressure of thirty to forty pounds, would answer to run this furnace ; that gasoline or other similar fuels could be used, though his experiments in this direction were not yet complete. S. S. White body could be biscuited in fifteen minutes. This furnace holds the heat while the enamel is prepared, and then it can be fused in fifteen minutes. In the construction of the furnace, advantage has been taken of every device to hold the heat. He would never attempt to reduce the time. The best results are attained when the piece is taken from the upper chamber and put into the lower just when it is ready to fuse.

Dr. D. D. Smith, Philadelphia, had never yet seen a gas furnace which was absolutely satisfactory. This may be an exception, as he hoped it would be. It seemed simple, and from the description he thought it probable it would do the work.

Dr. George Evans, New York, described his method of forming hollow gold molar and bicuspid dummies for bridge-work, and also of making collar or ferrule crowns, in which no gold is exposed at the cervico-labial portion, as follows :

Practical experience in bridge-work evidences the advantages of all-gold bicuspid and molar dummies in cases which properly admit of their use; but where they are long or large, the weight and expense, owing to the amount of gold required to fill them, are at times objections to their use. To overcome these objections and lessen the labor of construction, he had lately devised a method of making all-gold dummies hollow, as follows: Take a contour gold crown of suitable size, with a thick grinding-surface, or one which has been thickened with solder and the flux removed, and cut away the gold forming the palatal section of the collar to the form termed self-cleansing, or shape the neck of the crown to the exact contour of the portion of the gum the dummy is to rest on, and scrape a little from the surface of the model to cause pressure and insure closeness of fit. Melt a small quantity of solder with flux to a ball form. Fit a piece of platinum plate, about No. 32 gauge, over the aperture; place the ball of solder on the platinum within the gold cap (see Fig. 1). Hold cap and platinum in a Bunsen flame, and heat slowly until the solder melts and appears under the edge of the cap, then instantly remove from the flame, trim the platinum, and stone the edges. This gives you a hermetically inclosed dummy-tooth of gold, from the interior of which the air has been exhausted by the heat. The dummy can then be placed in its position on the bridge and soldered in the usual manner. Fig. 2 gives the palatal aspect of a bridge the dummies of which were constructed in the manner described. The bicuspid dummy is given a self-cleansing form, and the molar is shaped to rest on the gum.

FIG. 1.

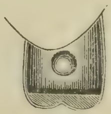
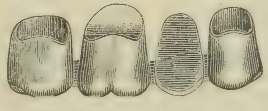


FIG. 2.



The advantage of a collar or ferrule on crowns for the front teeth, as affording additional security of attachment and insuring against all possibility of longitudinal fracture of the root, is generally accepted.

The objectionable features of collar crowns are the exposure of the collar at the cervico-labial section, which is difficult to avoid, and the irritation its presence there is apt to cause the peridental membranes, which it is more liable to do at this point than at the other sides of the root. The collar, to be invisible, has to be fitted well under the gum-margin. This requires extensive removal of the periphery of the cervico-labial section of the end of the root, rendering adaptation of the collar at this point an operation few practitioners succeed in accomplishing perfectly. An examination of collar crowns in the mouths of patients frequently results in showing a condition, as regards construction and adaptation, such as is shown in Fig. 3, at either of the points A or B, or both. At A, the edge of the collar, owing to the inward slant of the root, protrudes slightly, and at B the porcelain is projected beyond the line of the collar for position or to hide the metal. Either or both in time produce and maintain an unclean condition, worse than a deep-seated line of cervical decay in a natural crown, causing irritation and gradual absorption of the adjacent investing membranes.

The form of crown about to be presented is not new in principle, neither is it offered as a universal substitute for the ordinary collar crown, but as embodying features which are advantageous, and without some of those found objectionable in the ordinarily used collar crowns. The method will greatly simplify and facilitate the operation, and it is one which can be accomplished by those of only ordinary skill.

Take, for example, the right superior incisor illustrated in Fig. 4. A shows the line of trimmed root; B, point at cervico-labial section which may be removed if it is desirable to have only the porcelain front cover that part. In Fig. 5 an enlarged outline of the surface of the prepared end of the root is presented, A being the labial and B the palatal side. The dotted line is intended to indicate the original form. The shaping is done in the usual manner with disks and trimmers. It will be seen that the line of the labial portion is left intact.

FIG. 3.

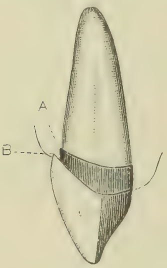


FIG. 4.

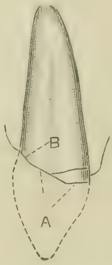
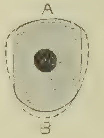
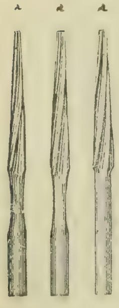


FIG. 5.



The root-canal is next enlarged with an Ottolengui root-canal reamer (see Fig. 6).

FIG. 6.



The size and condition of the root and the judgment of the operator should determine the number or size of reamer to be used and the depth to which the canal should be reamed. To the reamed canal is fitted a prepared iridio-platinum post, as illustrated in Fig. 7, corresponding in size by number to the reamer used. These posts have a screw-thread cut on the sides, tapering downward to the point, so that they can be screwed just where wanted and soldered in an instant. Next take a prepared disk of platinum plate, having a perforated concave depression as seen in Fig. 8. This depression fits in the orifice of the root-canal. If necessary, the orifice may be slightly enlarged with a round-headed bur. This disk of platinum plate, which is about No. 35 gauge, is made by stamping with a punch or die such as were exhibited. In the depression in the disk, as shown in section

FIG. 7.

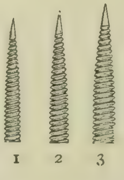


FIG. 8.

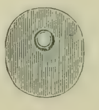


FIG. 9.

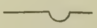
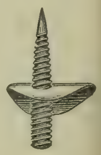


FIG. 10.



in Fig. 9, pure gold with a little flux is melted, and in the center of this gold a hole is punched through the disk. The post when fitted to the canal is grasped at the line of the orifice of the canal with small pliers, the post removed, and without moving the position of the pliers it is screwed into the disk up to the points of the pliers, thus giving the post its position in the disk. The sides of the disk are bent on account of the approximal teeth, as shown in Fig. 10, and the relative positions of the post and disk on the root are determined.

The disk should fit in the orifice of the canal when the post is in position. By twisting the post in the disk, change of position is instantly effected. Both post and disk are next removed, and the post secured in position in the disk by being held in a Bunsen flame, and heated to a point that fuses the pure gold in the depression. No flux is necessary, as sufficient remains from the first fusing of the gold. The post with the disk is next inserted on the root, the platinum pressed with a large flat plugger, and malleted so that the line of the edge of the end of the root will be impressed upon it. The platinum is next removed, and slit at the two points between the palatal and approximal sides shown at A and B, Fig. 11, and guided by the mark of the end of the root on the platinum the approximal portions are bent over with small-pointed pliers to embrace the sides of the root. The post and cap are then placed on the root, and the side flaps, with the aid of foot-shaped condensers and burnishers, are closely fitted. The palatal flap is next brought down to position. Frequent removals and annealings are necessary during the process, which should include finally trimming the edge of the platinum, smoothing with a corundum point, and then an annealing and an all-around burnishing of the cap to the root.

FIG. 11.

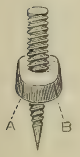


FIG. 12.

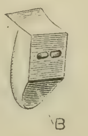


FIG. 13.

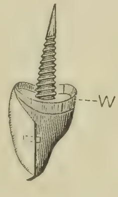
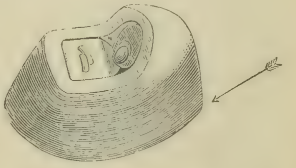


FIG. 14.



At the cervico-labial section the porcelain can rest on the platinum, or the platinum can be trimmed so that the front edge of the porcelain may be fitted against the root, covering it (see Fig. 11). The projecting end of the post should also be removed, leaving it a little flush at the palatal side. The porcelain front, which should be a cross-pin plate tooth, is ground and closely fitted to the surface of the root or metal, as may be, at the cervico-labial section under the edge of the gum, but a properly shaped space opening toward the palatal side is left between it and the surface of the cap. To so shape the porcelain simplifies the fitting of the cervical section. The space between the cap and the porcelain is also easier filled in the soldering. To the porcelain front at the part B (Fig. 12) a piece of very thin platinum foil is shaped, the porcelain heated, the part veneered with a mere film of gum-shellac, and by pressure with a napkin or cotton the platinum foil is attached thereto. The rest of the porcelain is then backed with thin platinum plate (about No. 35 gauge). The platinum is left slightly extending over the incisor edge, and the porcelain front is waxed in position on the cap.

Fig. 13 shows the crown waxed up ready for investment. Wax in full amount must be extended over the collar to its edge, in the seams, and between the porcelain and the cap at every point solder is to flow. (Dr. Evans generally uses Parr's fluxed wax.) Fig. 14 shows the invested crown with the wax removed. In trimming the investment, the material must not be removed from over the collar lower than the line of the surface of the cap, or in such a manner that the platinum turn-over edges are exposed to the direct force of the flame. If the collar is not exposed, the solder will flow over the outer surface of the platinum just where it is wanted and where wax has been applied, and all the parts will become united.

The investment must be slightly raised at one end, and heated up at its base with the full flame of a gas blow-pipe thrown in the direction indicated by the arrow in Fig. 14. Heat thus applied will cause the solder to flow downward and fill the interstices in all parts of the investment as though it were an ingot. The best way is to apply a little solder at a time until the deep parts are filled. The flame is then withdrawn for an instant, and with a small pointed flame and more solder the backing can be contoured. As platinum forms the cap and backing, the soldering can be conducted without fear of accidentally fusing those parts.

The form of crown described, as well as the ordinary collar crown, he usually cements in the following manner: Having the root and crown ready, he warms the crown and applies a thin coating of chloro-gutta-percha to the post. The chloroform, instantly evaporating, leaves a film of heated gutta-percha. Immediately the crown is adjusted to the root and removed. This shapes the gutta-percha on the post. The crown is then allowed to cool, and is cemented on as though no gutta-percha was used on post. A crown so cemented can be removed at any time by repeated applications of the thick part of a heated root-canal drier to the metallic portion of the crown, which communicates the heat to the post. In a short time the sheath of gutta-percha around the post is softened, and the crown can usually be removed without difficulty. He also attaches ordinary bridge-work in this way, having abandoned the use of methods classed as "detachable," which only allow the bridge to be removed by the dentist.

Porcelain can be used in the construction of the crown described instead of gold solder. In such a case, the porcelain front should be attached to the end of the post. This can be done by flattening the end of the post and riveting the pins, or by soldering them.

Dr. R. R. Freeman, Nashville, Tenn., anneals frequently when soldering up. When he attempts to solder a hollow ball, as just described by Dr. Evans, he finds that the expansion caused by the heating of the air within and the subsequent contraction are apt to cause flaws, which will let the secretions in and cause foulness. Therefore, in making crowns in this way, he puts a little asbestos where he will know its position, and then when he heats up until the air is driven out he puts in a little filling or a screw at that point.

Dr. Evans could not see how the secretions could enter a hermetically sealed gold ball. If Edison can secure a vacuum in his incandescent lamps, we certainly can do it in a gold crown. If the work is done in the way described by the speaker, the secretions cannot get in.

Dr. Freeman maintained that he could heat up the very plate shown by Dr. Evans, and demonstrate that there is air or some gas expelled. When it begins to cool, air has no trouble in going through the solder, and thus make way for the secretions of the mouth.

Dr. C. Sill, New York, wanted to know what was the object of the spiral post in the method described by Dr. Evans, as he uses the chloro-percha for filling the threads, and thus making the post smooth, and destroying the very means apparently devised for holding it firm. He could see no advantage in a screw-thread on the post if the blades are to be filled up.

Dr. Evans explained that his trouble with posts was not in making them hold, but in so placing them that when necessary they could be gotten out. As before suggested, the reason for the thread in the post is that it then can be screwed just where it is wanted, and soldered in position with reference to the cap in an instant.

Dr. Frank H. Gardiner, Chicago, thought we must be retrograding if this method is offered as a new procedure. Dr. Wildman had taught him this method sixteen years ago. The trouble is that in making these crowns many mechanical dentists solder on the inside when they should solder on the outside, and the crown will not go up to place. If the soldering in these cases is done on the outside, the crown will fit all right.

Dr. J. N. Crouse could understand how one in the audience at the rear of the room could not get a clear idea of the manipulations described, and should so confound them with old operations, especially as there was no blackboard to show drawings upon. For himself, however, he had never seen any method of making crowns which suited him so well as this just described by Dr. Evans. It was the neatest way he had ever seen. The same operation can also be done by baking on a porcelain front, which makes the tooth cleaner and clearer, and the neatest and most convenient crown after it is completed he knew of. The old way, to which Dr. Gardiner referred, was about the meanest that could be conceived of, and he was not surprised that that gentleman thought a return to it a retrograde movement. The crown described by Dr. Evans was completely clean and serviceable.

Dr. Truman W. Brophy, Chicago. This misunderstanding of Dr. Gardiner's leads one's thoughts back to the days when we had clinics. In an audience of this size it is impossible that an operation of this sort should be told so as to be understood, except by demonstration, and he hoped the day would come when clinics would be re-established by the association. He did not believe that twenty per cent. of those present understood the method described, and well described, by Dr. Evans.

Dr. H. B. Noble, Washington, D C., described Daly's method of lining rubber plates with pure gold, which he regarded as the best for the purpose he had ever seen. It is made by depositing the pure metal on No. 20 gold foil until it is between 50 and 60 in thickness. In making a vulcanite plate with this lining, proceed as usual up to the removal of the wax. Then varnish the model with sandarac.

and when this is dried coat with dammar varnish to give it a sticky surface, so that the lining will not slip when the rubber is packed upon it. Cut the lining into small pieces and put them on, slightly overlapping one another at the edges, so as not to leave any point uncovered. Then fill in with the rubber, taking care not to leave it thicker at one place than another, and putting the pieces in as near as possible the positions they are to occupy, to prevent drawing. Then vulcanize, and when the plate comes out burnish and brush as much as you please. There is no doubt about the durability of a plate so made. It is clean and pure, will wear as well as a solid gold plate. A rubber plate so made is more dense than the ordinary plate, because it is pressed against a hard metal surface in vulcanizing.

Dr. W. St. George Elliott described a method of vulcanizing rubber between metal surfaces which had been introduced into England within the last few months by Mr. Humby. It is in fact an adaptation of steam-swaging, and the idea was not original with Mr. Humby, having been used in manufacturing vessels of thin metal. The apparatus resembles somewhat a small vulcanizer, the upper part of which is in the form of a hemisphere, the lower part a cylinder. The model is placed in the upper hemisphere, which at its highest point has a hole to communicate with the atmosphere. The parts are then screwed together, and heat is generated, producing a pressure of one hundred and twenty pounds. As soon as the metal is blown up by the force of the steam, it blows out through the orifice. The utility of the process is practically confined to thin metals, but it has been used successfully in swaging vulcanite plates. It has the advantages of extreme rapidity, the rubber is of equal thickness, and the rugæ are well copied. It makes an excellent trial plate.

Dr. L. E. Custer, Dayton, O., described a method for fusing platinum by electricity. He takes advantage of the well-known fact that electricity in passing through the air produces an arc of the most intense heat known. Connected with an incandescent current he has a rheostat of slate with copper wires so arranged as to bring the effect under control. With this he can melt about an ounce of platinum at a time.

Dr. E. A. Bogue, New York, had used the hydraulic press for swaging to a considerable extent. He mentioned several which he had tested: an English press designed to swage gold for upper plates, taking the impression with Stent's compound and forming the die with Spence metal poured into the Stent; but the Spence metal was too brittle. Telschow, of Berlin, after considerable experimenting with presses, hit upon the expedient of placing a heavy sheet of rubber beneath the gold plate, and this did well, but it had its drawbacks. The French, from their experience with the hydraulic press in making straw hats, began to make presses for dentists. The first of these was a ponderous affair which he got many years ago. Some two or three years ago he had come across a press which was quite small, say ten inches by two feet. It costs about sixty dollars, and may be worked by any laboratory workman. By pressing the gold plate steadily, as the hydraulic press does, a better adaptation is made than can be struck up with the hammer or with a pile-driver. He has nowhere else seen such perfect adaptation to the plaster models with so little trouble as is produced by this apparatus.

Dr. Charles R. Butler, Cleveland, O., wanted to know if it was possible to ascertain whether a plate swaged up in this press was not thinned just where the most strength was needed.

Dr. Bogue replied that he had calipered plates so made, and had found the metal stretched at points, but no more so than in those which were hand-swaged.

Dr. Butler apprehended that if the plates were carefully tested with the calipers, it would be found that the reason why there was better adaptation was because the palatal surface was considerably thinned.

Dr. Bogue. It is not necessary to put more force on the plate with the press than with the hammer.

Dr. Elliott. The Spence metal has now nearly gone out of use. It has a low melting point and is exceedingly brittle, though it will withstand great pressure if gradually applied. Another method of Telschow's not mentioned by Dr. Bogue was one in which he used the press only for the final process, doing the earlier part of the work in the usual manner.

Dr. Barber, Toledo, O., had seen Dr. Parker, of Grand Rapids, Michigan, demonstrate a method of swaging with shot. The impression is taken in plaster, and a die cast with fusible metal, over the face of which the metal for the plate is pinned. It is then put into a cylindrical holder of malleable iron, the bottom of which is filled with fine shot, No. 12. More shot is added over the die, and a piston turned to fit the holder is malleted down upon it. By this method he gets certainly as good adaptation as by any other method of swaging, and without the trouble of making cores, etc.

Adjourned to 9.30 A.M., Wednesday.

(To be continued.)

During the sessions, Dr. A. Boice, Philadelphia, called attention to unjust statements which have been made regarding the history of the movement to have the classification of dentists for the census of 1890 changed, and moved the appointment of a committee of three to have a correct history prepared. The motion was adopted, and the following committee was appointed: A. Boice, W. S. Twilley, and C. A. Meeker.

Dr. B. Holly Smith, Baltimore, moved the appointment of a committee of nine to undertake the preparation of a system of terminology, and that it be a permanent committee, with power to report progress next year and be continued. The motion was adopted, and the committee was appointed as follows: S. H. Guilford, Louis Ottofy, M. L. Rhein, Thomas E. Weeks, C. L. Goddard, L. D Shepard, D. R. Stubblefield, Grant Molyneaux, and A. H. Thompson.

Dr. Thomas Fillebrown, Boston, offered a resolution, which was adopted, providing for a committee of five to confer with the Southern Dental Association in regard to the advisability of combining the two associations, thus forming one national association. Drs. Thomas Fillebrown, B. Holly Smith, Louis Jack, J. Y. Crawford, and J. N. Crouse were appointed the committee.

Dr. A. W. Harlan, Chicago, offered a resolution providing that hereafter there shall be two general addresses delivered before the association, on some subject of universal interest, on the second and third days respectively of the annual sessions ; the third division of the Executive Committee to name the subjects, and the first division to select the essayists for the ensuing year. The resolution was adopted.

Asbury Park, N. J., was selected as the place for the next meeting, and the following officers were elected for the ensuing year : J. Y. Crawford, Nashville, Tenn., president ; S. C. G. Watkins, Montclair, N. J., first vice-president ; Thomas Fillebrown, Boston, second vice-president ; George H. Cushing, Chicago, recording secretary ; Emma Eames Chase, St. Louis, Mo., corresponding secretary ; Henry W. Morgan, Nashville, Tenn., treasurer ; C. N. Peirce, Philadelphia, H. A. Smith, Cincinnati, T. S. Waters, Baltimore, and Louis Ottofy, Chicago, executive committee.

SOUTHERN DENTAL ASSOCIATION.

THE twenty-sixth annual meeting of the Southern Dental Association was held at Old Point Comfort, Va., beginning Thursday, August 2, 1894. The sessions were held in the Hygeia Hotel.

FIRST DAY—*Morning Session.*

The association was called to order by the president, Dr. B. Holly Smith, of Baltimore, at 11 A.M. The session was opened by prayer offered by Dr. W. H. Morgan, of Nashville, Tenn., which was followed by an address of welcome by Dr. E. P. Beadles on the part of the Virginia State Dental Association.

Dr. Beadles regretted the absence of Dr. W. W. H. Thackston, who had been appointed to make the address of welcome, but was ill, and consequently unable to perform the duty ; but in his place he welcomed the association in a few eloquent words, and expressed the hope that their meeting would be fruitful in good work, pleasant memories, and increased good-fellowship.

Dr. B. Holly Smith followed with the annual presidential address. He spoke of the value of these annual gatherings, their educational and social usefulness, but thought their usefulness would be increased if there were more definiteness in their aims and their conclusions. To attain a higher usefulness they must have *results*, and to achieve these the members must unite to work upon a well-defined plan. They should seek to exert a stronger beneficial influence upon the subordinate societies, to do which it will be necessary to enter into closer relations with these societies. Until this is done the full benefit of the annual gatherings will not be attained.

Another quality lacking in the councils of these associations is definiteness and decision ; questions are discussed, and discussed again, but never settled. Some of the questions concerning the general welfare of the profession which come up every year should receive an authoritative decision, and the policy of the profession in regard to them should be settled for once and forever by the representative bodies. Among such questions are the admission of candidates to the right to practice, the character of law desirable, and what means it is possible to take to secure uniformity of laws through the whole country.

On motion of Dr. J. Taft, the address was referred to a committee, consisting of Drs. J. Taft, J. Y. Crawford, and B. H. Catching, for consideration and such action as they think proper.

The minutes of the last meeting were read and approved.

On motion of Dr. Crawford, the courtesies of the floor were extended to all members of the Virginia State Dental Association and other visiting dentists.

Dr. V. E. Turner, Raleigh, N. C., chairman of the Executive Committee, read his report, detailing the arrangements for the meeting, etc. The association then adjourned to meet at 3 P.M.

Afternoon Session.

The association was called to order by the president at 3 P.M. The report of the Committee on Prosthetic Dentistry was called, and Dr. Thomas P. Hinman read a paper, of which an abstract follows, entitled,—

AN ORIGINAL METHOD OF PROTECTING THE TIPS OF PORCELAIN TEETH IN BRIDGE-WORK; ALSO A SIMPLE METHOD OF BANDING A LOGAN CROWN.

We should always use "up-and-down pin teeth," instead of the "cross-pin teeth," as the strain is more equally divided, the pins being placed on the long axis of the tooth and usually farther apart.

To protect porcelain facings from the strain of mastication, bevel the porcelain upon the inside upon a corundum-stone, grinding carefully toward the cutting-edge, so as to leave it a knife-edge. This grinding should be done with a fine corundum-stone, as a coarse stone would be liable to fracture the porcelain at the thin edge. Now back up the tooth with 22-carat gold, No. 29 gauge, letting the gold extend about one-sixteenth of an inch beyond the cutting-edge, but not burnished to it. The backing is now covered with base-plate wax, the wax trimmed away over the beveled facing, the tooth invested so as to cover up everything except the wax, and solder is flowed over the exposed part of the backing, restoring the contour of the teeth. When cool, remove and polish each facing, wax into position on the bridge, arrange the teeth as desired, reinvest, and solder the joints. When again cool, remove and burnish the part of the plate not covered with solder down to the beveled portions of each tooth, thus protecting the cutting-edge from strain by making it an inclined plane. The angle thus made will prevent the pressure on the porcelain, it being sustained by the backing.

To band a Logan crown, prepare the tooth as for a Richmond crown, make a band of 22-carat gold plate, No. 29 gauge, leaving it extra wide, and larger at the opening than at the root end. Grind the selected crown to fit the root approximately, removing the band for the purpose. Replace the band on the root, grind the crown to fit the opening of the band tightly, and drive home with a mallet, the band hugging the crown very tightly. Remove band and crown together, and with a corundum-stone grind the band away in front, leaving it very long in the back. The grinding should be always toward the tooth, so as to burnish the band to it, the long portion in the back being ground and burnished by the grinding over the bulbous part. If done carefully the band will cling tightly to the tooth, and a perfect joint will be made, requiring no inside disk and no soldering. The operation can be done quicker than by attempting to shape the crown to fit in the abutment of the root, and is certainly much stronger and more durable.

Discussion.

Dr. H. A. Parr, New York, said the method described of burnishing the gold down to the edge to secure strength was not new, and that it was not always easy to use straight pins where the tooth is not close, and in case they were used one pin only would receive the strain.

Dr. Hinman replied that the new point was to burnish the gold down to the beveled edge after the soldering was finished.

Dr. W. H. Morgan said the process as described appeared to have its advantages, but in practice it would be found difficult to burnish the gold down to such a bevel perfectly, as the action of the burnisher on the gold would have a tendency to make it spring away from, rather than lie close to, the tooth.

Dr. Parr said it would be impossible to make the gold lie so close as to make a good joint. In such an operation the gold should extend over the edge of the tooth, and then the solder should be run in between the gold and the porcelain. There was no danger of the porcelain being broken by the heat.

Dr. W. C. Barrett, Buffalo, never could burnish gold to the porcelain as described in the paper. His plan was to flow gold solder in. The subject of crown- and bridge-work is endless, but it is a very profitable subject for discussion. Only a short time ago we had to extract teeth which now we save by means of crowns and bridges. Our knowledge of the methods and possibilities of this work is not perfect, and we in some instances do as much harm as good in our attempts ; but we are learning, and have already learned to save teeth which we formerly would have condemned. He therefore was always glad to hear any paper which brings out discussion on the subject.

Dr. L. P. Dotterer, Charleston, S. C., often came across bicuspids or molars with the palatal wall standing and the other walls gone. In such cases he makes an artificial crown with a porcelain facing backing it, and adjusts it in place with a band ; in other words, makes a regulation gold tooth, which will accommodate the portion of the tooth still left, and gets a porcelain facing for effect.

Dr. R. R. Freeman, Nashville, exhibited and described a method of taking the bite for crown and bridge cases. His plan was to take the bite in modelling composition, and his model is gotten by pouring Melotte's metal into the impression thus taken. By this means he is enabled to get a correct occlusion, for, if the bite is not good, by malleting and swaging he can bend it to place.

Dr. John R. Thompson, Atlanta, asked whether the metal would not soften the modelling composition so as to give a very poor impression.

Dr. Freeman said it would not if used properly. He arranges his modelling composition in ice-water or on a piece of ice, and puts some water in the spoon with the fusible metal, so that it will not get too hot. By these means he gets a very sharp impression.

Dr. W. G. Browne described a method of backing teeth by using platinum very thin, burnishing it approximately to the tooth with gold foil or cylinders under it, then with a corundum-wheel grinding the platinum off to a feather edge. When it is soldered, the solder will follow the gold cylinders under the platinum. When he wants to darken the tooth, he does not put gold back of it, but depends upon the close adaptation of the platinum.

Dr. W. O. Kulp, Davenport, Iowa, said that he could never burnish gold into place. He found that the more one burnished it down, the more it would spring back. His plan was to use platinum or gold of about No. 24 gauge, anneal it, and press it as closely to place as possible with a piece of soft wood, then anneal again and press closer. In this manner he gets good adaptation.

Dr. Hinman, in closing the discussion, said that he secured adaptation of the gold to the beveled edge described in his paper by rubbing the gold down with a piece of corundum or pumice stone.

Dr. E. P. Beadles, Danville, Va., read a paper on "Anterior Fillings," of which we give an abstract as follows :

Dr. Beadles stated that he should discuss briefly the operator himself, and then the preparation of cavities and introduction of filling-materials in the four upper incisors and two cuspids. With reference to the first point, he observed that no operator, no matter how expert, can perform good work in a cramped, awkward, and tiresome position. The least tiresome, a perfectly natural position, standing upright, to the side and partially behind the patient, is the position to assume when operating upon the anterior teeth, and with very slight modifications for all the teeth. Lest any may not understand how this is possible, he would say that with the mouth-mirror—without which he never fills a cavity—the upright position can always be maintained. No man who has not made intelligent use of the mouth-mirror can imagine what it saves in comfort to patient and operator.

In preparing the cavity, above all other things do not mutilate the teeth. Only a few days since the writer had seen a young lady's mouth with almost every tooth cut out of shape by V-shaped spaces from central to third molar. Don't use rubber wedges, or separators, or wood wedges, to make room. All that is needed, except in rare instances, is space enough to pass a thin sand-paper disk through ; and this can be gained, if so required, by wedging in a little dry cotton, not too tight, and allowing it to remain till the next day. The filling will then be simple and easy, if the enamel-wall on the lingual side is then all cut away, so that the entire cavity, reflected in the mouth-mirror, is exposed to the eye. No man can fill a cavity properly unless he can see every part of it.

The shape of the cavity when prepared should be that of a cube with round corners, with sometimes a slight groove in the cervical wall for the reception of the first piece of gold, which should be non-cohesive. After filling the groove overfull, condense well over the cervical margin and burnish then and there, once for all. This leaves the margin safe, and it can be done more thoroughly at this time than at any other.

The entire filling can be made of non-cohesive gold, but Dr. Beadles prefers, from this point on, to use the cohesive, rolling between the fingers, annealing, and cutting into pellets of the desired size. Keeping the approximal wall well burnished as the work proceeds, it will only be necessary to polish with a fine sand-paper disk, finishing with cuttle-fish.

One small straight, or nearly straight, round-pointed, steel-handled plugger, one flat-pointed and one or two right-angled, round-pointed, ebony-handle pluggers are all that are necessary. The gold is packed thoroughly against every wall, pressure being directed always toward the wall, with smooth points, serrated instruments leaving a space which will become a leak. Don't pound the gold too much, and when the cavity is filled to the proper point, stop, instead of building on more gold to trim off. Dr. Beadles is a firm believer in hand-pressure, using no mallet except the automatic occasionally. By the method described, with hand-pressure, frail walls can be built against with safety and the assurance that the filling will remain. He sometimes uses cement or amalgam in connection with this method, even in anterior teeth, filling the cavity nearly full and facing with gold.

Discussion on this paper was postponed till other papers on kindred subjects should have been read. The association then adjourned till 8 P.M.

Evening Session.

The association was called to order by President Smith at 8.30 P.M.

Dr. S. W. Foster read a paper entitled "Some of the Merits of Contour Fillings made in the Laboratory."

Dr. Foster, in enforcing the desirability of employing methods and appliances which cause the patient the least pain and discomfort while undergoing the operation, related the case of a young man, a machinist, who, two years ago, while at work, had both upper central incisors broken smoothly off from the gingival margin of the mesial surface diagonally across to the angle of the distal surface. The patient objected to artificial teeth of any sort, and insisted that the broken crowns be built up with gold. The right central was so built out, anchorage being secured by a gold wire set in the tooth and pointing diagonally toward the mesial angle. The operation consumed nearly three hours, and both patient and operator were completely worn out.

The left central, which was a duplicate of the tooth just described, except that the pulp was more nearly exposed, was restored by a thin piece of platinum to the margin of the fracture, extending it a little over the edges; then three small holes were drilled through the platinum, in which platinum pins were inserted at parallel angles, and the contour was restored in wax. Over this from the labial surface across the mesial edge, back and flush over the fractured edge of the palatal surface, was burnished another piece of thin platinum; the burnisher used being warm, the platinum adhered to the wax. The whole was then removed and invested, leaving the mesial margin exposed. The wax was burned out, the pocket filled with 22-carat gold solder, the investment removed, and the piece finished and adjusted to the tooth, the entire operation being completed in a little over an hour, without discomfort to patient or operator.

These teeth were examined a few days since, and while the first was found slightly pitted over the surface and with the angle of the mesial corner a little defaced, the second retained a perfectly smooth surface and was in perfect position, giving a much better expression than its fellow.

Discussion.

On motion, the papers of Dr. Beadles and Dr. Foster were discussed together.

Dr. Frank Abbott, New York, opened the discussion, saying that the dentist should make it a point to perform all operations in the mouth in that manner which would cause the patients the least pain and distress, so long as these methods were consistent with success in restoring the organs to usefulness. By care in this regard the patients were encouraged to have their teeth saved, while without regard to this care the pain and dread of the operation would deter them from the effort until too late to save the teeth.

At the time the rubber-dam was introduced it was looked upon as a great boon to the dentist, and the speaker at once got a supply. On using it, he found the application took so much time and was so painful to the patient that almost at once he discarded it, finding that with the use of napkins and bibulous paper he could often fill a tooth in less time than it took to apply the rubber-dam. Since then he had not used it in one case out of one hundred.

When he began practice, arsenic was generally used for obtunding purposes. It was applied for a few hours, and the tooth would die. Now there are so many obtundents, that every one uses something for the purpose of obtunding sensitive dentine. For himself, he depends upon the action of an alkali, usually soda. He instructs the patient to dissolve a spoonful of soda in a tumbler of water and rinse the mouth with it a dozen times a day, for two days before the date of the appointment ; then if at the time of the operation the soda is applied dry on the tooth, the sensitiveness will not be so severe as to be troublesome. Normal dentine, however, is not sensitive.

Dr. J. Y. Crawford, Nashville, said he favored the method by which Dr. Foster filled the last tooth, but he thought 24-carat gold should have been used instead of platinum. The making of the pocket by burnishing the platinum over the wax was not necessary, as gold could have been adapted to the tooth. All front teeth should be restored in this way in the mouths of men, but in ladies' mouths, for esthetic reasons, porcelain should be used. The important principle is to place the pins so they will guide the piece just where you want it to go. He does not like the use of too many metals in a mouth. The nearer we approach the natural conditions of the mouth, the better will we be able to combat the pathological conditions we are called upon to treat.

Dr. W. H. Morgan, Nashville, had had no experience or observation in making fillings in the laboratory and applying them to the teeth. His method was always to contour such cases, and the results had always been satisfactory. Sometimes the pulp is so exposed that the roots are to be filled. In the case of a young person the root is not in good condition, as the end of the root-canal is funnel-like, with the funnel sloped in the wrong direction. Cases like this are troublesome, but he had filled such which have stood many years. He mentioned the case of a student where the mesial borders of both centrals were broken off and decayed. He prepared the teeth and filled them with gold, filling the roots and building the filling out about a line and a half. Some students who were watching the operation timed it. It took just fifty-five minutes, and six and a half books of gold were used.

There are many things in Dr. Beadles's paper which might be objected to. He was too dogmatic in his assertions about the use of the mirror. The speaker never fills with the mirror, as he thinks a man working with two hands can work faster than he can with one. He objects to what Dr. Beadles said was the proper position for a dentist,—that is, at the side and rather behind his patient. Dr. Morgan prefers in many cases to stand in front He usually, however, stands at the right side of the patient, though for some men the left side is the proper and best position. Dr. Beadles stated in the most dogmatic manner that rubber for wedging produces so much pain that it should never be used. The speaker uses rubber and he uses wooden wedges, and in many cases they are better than anything else. Another point that Dr. Beadles insisted upon was that hand-pressure was the mode of filling teeth above all others. For twenty-five years Dr. Morgan had used nothing but hand-pressure, and he knows that he has often used the mallet with much less pain than would have been caused by hand-pressure. The true philosopher does not lay down a dogmatic rule to govern every case, but is guided by the indications and peculiarities of each case as he sees it. Sometimes the separation must be done slowly, in other cases it may be done at once. Certainly when a large rubber wedge that will keep up a constant pressure on the teeth is inserted and left there, it will cause the patient to suffer intensely, but a smaller piece of rubber that will separate the teeth and then cease to act will not be painful. Dr. Morgan was surprised to learn that arsenic had ever been used to obtund pain in teeth ; if so used, the tooth would surely die. In days gone by he had used a spray apparatus with ether. By using this carefully the sensitiveness may be lessened. Rubber-dam he considered very useful, and even indispensable.

Dr. Beadles disclaimed all intention of being dogmatic, or of laying down rules for any other than himself. He denied saying that Dr. Morgan could not fill teeth without using the mirror, or that any other man could not. He only asserted that that was the best way for him personally to work.

Dr. Geo. J. Friedrichs, New Orleans, had been very unfortunate and naturally lazy, and so he had been settled in New Orleans instead of Nashville. His experience with hand-pressure and the mallet had been contrary to that of Dr. Morgan. The hand-pressure had been so much less painful to his patients that they would not allow him to use the mallet.

Dr. H D. Boyd, Troy, Ala., said he had a tooth in his mouth into which arsenic had been put to relieve sensitive dentine; the arsenic had remained in for thirty minutes, and the pulp is alive yet. The cavity is located on the anterior approximal surface.

Dr. Morgan said there were exceptions to every rule, and there were also idiosyncrasies, and that this case was one.

Dr. Frank Holland, Atlanta, understood Dr. Abbott to state that the dentine of a tooth in normal condition was not sensitive, but in cutting away the dentine of a perfect tooth for the purposes of bridge-work it will be found to be sensitive.

Dr. Crawford said that the fact that the dentine in the normal tooth of the normal man is not sensitive, and that in the average American it is sensitive, is a terrible sign of over-nervous condition of the average American. He commended the paper read by Dr. Beadles in most points, but could not agree with him about the proper position at the chair. In the filling he described he should not only have used hand-pressure, but should have used non-cohesive gold, which would have placed the filling in shape to be of the highest therapeutic value.

Dr. Morgan asked if non-cohesive gold could not be packed as well with the mallet as by hand.

Dr. Crawford replied that no doubt it could be as easily with the mallet, but he did not think that it would usually be packed as well.

Dr. C. S. Grindell, Baltimore, asked Dr. Abbott how he knew that normal dentine was not sensitive.

Dr. Abbott said that it was a simple, easy matter that came under every one's experience. We cut it, and find that the cutting causes no suffering.

Dr. L. M. Cowardin, Richmond, thought that the sensitiveness of dentine depended upon idiosyncrasy of the individual. Patients who are gouty or rheumatic usually suffer exquisitely when the dentine is excavated. He has such patients the pulps of whose teeth it is impossible to destroy with arsenic. He does not think that the dentine or any other tissue is normal in a patient suffering with rheumatic gout.

Dr. Abbott said that when opening a cavity in a carious tooth at first you cut into the dentine which has been affected by the caries, and it is sensitive; but when you get to normal dentine the pain ceases. Rheumatism is caused by an acid condition of all the fluids of the body, and the sensitiveness will be shared in by the teeth. Normal dentine is not sensitive, because it has no nerves of sensation; but when it becomes inflamed, it becomes full of sensitiveness. Going further, the normal pulp is not sensitive; its terminal fibrillæ will carry only pleasant sensations; but when it becomes irritated and inflamed it becomes painful. We have all of us wounded the pulps of teeth without our patients' knowledge; we simply did not cause them any pain.

Dr. C. N. Peirce, Philadelphia, as a young man in the profession was much interested in the wisdom of his elders. If the assumption that normal dentine was not sensitive was true, then we never touch normal dentine. Now to say that the normal pulp is not sensitive is absurd. It is sensitive to every test, but abnormality increases its sensitiveness.

Dr. R. R. Freeman, Nashville, spoke of the use of mechanical separators. His way was to apply the separator and turn the screw, watching the patient's eyes the while. When he sees an expression of surprise, or something appear there, he allows a rest till the normal condition is restored, and then operates. He favors the use of rubber-dam too, and uses it to save pain and trouble, both to himself and his patient. When he does not use separators he uses cotton wedges.

Dr. H. E. Beach, Clarksville, Tenn., indorsed the rapid mode of separating. He had tried every way, and did not think any one could be comfortable with a rubber or wooden wedge, or even a cotton wedge, between the teeth for two or three days, and wedges should not be left for any such time.

In closing the discussion, Dr. Beadles said he did not understand how it was possible for Dr. Abbott to do what every dentist must do without the use of the rubber-dam. He had not intended in his paper to be dogmatic, but merely to state plainly what his individual methods were,—the methods which bring him success. His success with approximal fillings in anterior teeth is as great, he thought, as any one had. He begins with non-cohesive foil and finishes with cohesive. By using the mirror, he sees every part of the cavity as he inserts every particle of the filling. By the position he assumes he is not forced to work in an uncomfortable attitude, and by the method of separating described he gets all the separation needed without subjecting the patient to unnecessary torture from wedges.

Adjourned.

(To be continued.)

AMERICAN MEDICAL ASSOCIATION—SECTION ON ORAL AND DENTAL SURGERY.

(Continued from page 636.)

SECOND DAY—*Continued.*

DR. L. L. DUNBAR, San Francisco, read a paper entitled "Oral Manifestations in Arthritic and Gouty Conditions," of which an abstract follows :

Dr. Dunbar stated that inasmuch as since he promised to write upon this subject the views of Dr. Peirce and other investigators have been published, what he has to say can now only be looked upon as added testimony. Almost every practitioner who has been identified with the treatment of so-called pyorrhea alveolaris has assumed the position that the condition was purely local and of undoubted calcic origin, differing only in degree of inflammatory and destructive action. The systemic connection has not been long recognized, the early writers adopting the views and the treatment of Dr. Riggs, by which much good was done in the early stages of any alveolar lesion. Clinical evidence has not been wanting, however, of prompt recurrence, and many have openly declared that extraction was the only real cure.

The writer has held the views here presented for years, with success enough in dealing with cases coming under his notice to warrant a closer study of the conditions known under the title " pyorrhea alveolaris," which simply expresses a phase in the progress of *some* manifestations, not necessarily accompanied by pus, and hence is inadequate. Recent investigations will bring us to a full conception of its systemic connection as a local expression of a disturbance in the intercellular fluids. Moleschott's theory of the connective-tissue channels, which was indorsed by Virchow, is of interest in this connection: "It is one of the grandest achievements of modern times, to the knowledge of which V. Recklinghausen and Virchow have paved the way, that the connective tissue has been raised from the secondary part which was at first allotted to it, to one of productive activity such as was never anticipated. What appeared formerly only designed as a protective covering appears now as the bed of the most minute and secret streamlets of juices or sap from the blood to the tissues, and back from these into the blood-vessels, and at the same time as one of the most important nidi or breeding-places of new cells, which, developed from the embryonic early shapes, can rise from the most peculiar and special structure of the body."

We lose sight of the fact that in the implantation of the teeth in their alveoli we have an articulation, in most of its connective-tissue relations the analogue of any other. The vaguely understood effects of arthritis deformans or rheumatoid arthritis may produce a degeneration of the peridental membrane and alveolar periosteum, as in the connective tissue of the other articulations. Garrod and Weber ascribe the manifestations of arthritis to trophic influence, which may account for its appearance in one locality to the exclusion of other articular surfaces in the immediate neighborhood. It may, therefore, occur in the dental alveolar articulation. In such cases, presenting clinically much the same appearance as alveolar pyorrhea, analysis of the animal fluids did not disclose uric acid, which again agrees with the authorities from which the paper quoted. In the treatment of arthritis deformans, Weber has had excellent results with tonics and the galvanic current applied to the spine and cervical ganglia. Volkman and Adams show that from the commencement of the inflammatory action the articular cartilage suffers, until finally the bone is left in part uncovered, or the whole surface may be denuded, the osseous surfaces being brought together and becoming polished by the movements of the articulation to an ivory-like condition called eburnification. Joints so affected crepitate, enabling the practitioner to differentiate the disorder.

Where the manifestation is in the alveolar dental articulation, it probably has its origin in the trophic center in the spinal cord corresponding to the part affected, septic complications being added when the pocket is once formed. With a better knowledge of the nervous relations of the teeth, many doubtful oral conditions will be better understood and properly classified.

The recently published investigations of Drs. Peirce, Kirk, Burchard, and others leave no doubt in regard to the effects of retained uric acid in the circulating fluids. In the light of Moleschott's theory we can understand how the peridental membrane may become the seat of deposits of urates of lime and soda. Its office is the deposition of lime-salts. In mild inflammatory conditions, without perversion of the circulating fluids, an increased activity is developed in the pericementum, resulting in deposition of cement beyond the typal limit. In similar inflammations caused by or accompanied with excess of urates in solution, a deposit of salts of calcium may be made in which analysis would show urates. We have no assurance that morbific materials in the blood would not cause the specific inflammation.

Serumal calculus is removable only by means equally destructive to surrounding tissues. In pockets of long standing, freely accessible to the fluids of the mouth, there may be an added deposit on the root which is removable, but only in the last stages, when re-attachment is doubtful. If the pocket is all on one side, and all removable deposit has been taken away, the loss of that limited area of peridental membrane is no barrier to a return to health of the surrounding tissue and the entire re-attachment of the tooth.

How much the uric-acid diathesis has to do with other destructive oral manifestations has not been determined, but the writer was convinced that some specific acid condition of the circulating fluids is the cause of erosion. He has endeavored to show that pyorrhea alveolaris is due to one of two or three systemic conditions requiring a different classification and a nomenclature suggesting in part its origin. When this has been scientifically developed, an entirely new system of treatment for each will be evolved. Already the study of this subject by dental practitioners has been the means of introducing an entirely new salt of lithium known as tartarlithine, or tartrate of lithium, first made by Dr. Edward C. Kirk, of Philadelphia.

What the dentist can do for these conditions will depend upon his preparation for practice and his conception of its scope. Certainly instrumentation is not to be entirely relied upon. To be entirely successful means a wider knowledge of systemic conditions and the ability to recognize the pathological significance of every oral lesion. Are dentists properly prepared for such work? The curricula of our best schools comprise all that is essential. Where they do not they should be strengthened, or the schools of medicine are open for post-graduate instruction, with liberal allowances for work already done, thus enabling the dental graduate to complete his preparation for practice upon its highest plane.

Dr. W. J. Younger, San Francisco, read a paper entitled "Pyorrhea Alveolaris." An abstract follows:

By the name pyorrhea alveolaris Dr. Younger means that condition in which patches of a slate-colored calculus partially or wholly incrust the roots of the teeth, with the alveolus more or less destroyed and the surrounding gums deep red, retracted, and congested,—though sometimes attenuated,—usually yielding pus on pressure at the cervical margin, though this feature may be absent. In consequence of the waste of the bony walls of the socket, the teeth become loosened and tender to pressure, frequently raised out of their sockets or forced out of their position, and finally, if the disease is allowed to progress to a conclusion, drop out through the destruction of their attachment to the alveoli.

The etiology of the disease is yet surrounded by mystery, though professional opinion is drifting strongly into regarding it as of constitutional origin, and the deposit of calculus—the bane of the disease and always present (some writers to the contrary notwithstanding)—as of hemorrhagic origin, due to imperfect nutrition, and connected with a gouty diathesis. That pyorrhea alveolaris may be connected with malnutrition is possibly true ; but the theory that it is of constitutional development, and especially due to a gouty diathesis, is not yet established. On the contrary, the writer's experience of over thirty years has convinced him that it is of purely local origin, and he is still inclined to the opinion he had expressed at a meeting of the California State Dental Association some ten or twelve years ago, that it is due to a diseased activity of the pericementum, caused by disturbed nutrition or a local irritation, whereby it produced, instead of bone, this disorganized abortion vulgarly called tartar, perishing in the effort by the irritation of its presence. This is why pericementum is never found under the calculus, why the constituents of tartar are analogous to those of bone, and why the pericementum is never in contact with the margin of the calculus ; for there is always a denuded strip of root between them.

While the irritation inducing the formation of the calculus may proceed from the blood, as the impaction of a capillary thrombus, it is usually due, in the writer's opinion, to some cause acquired from without. The deposit is first formed near the cervices, being found near the ends of the roots only in mature life or advancing age. There is always free communication between the calculus and the cavity of the mouth, which shows the probability of migrating germs or some substance from the mouth being the original or exciting cause of the mischief. If the disease were of constitutional origin, there would be many cases with no lesion whatever between gum-tissue and tooth-neck. Moreover, he had found the disease in advanced stages in persons who had always been exempt from any constitutional ailment whatever, who had no gouty or rheumatic diathesis, inherited or acquired, and who had never had dyspepsia or any form of indigestion.

Another fact which tends to prove pyorrhea alveolaris to be a local disease is that when once it is cured and the gums made to reattach themselves, the disease does not return to them.

The best way to try a theory is to test it clinically. Dr. Younger then related cases bearing on the point. The first was that of a lady, of gouty diathesis by inheritance so marked that the finger-joints were swollen and tender, and uric-acid salts were continually deposited in the follicles of her throat. One upper right and two upper left molars were so loose that it was declared to be impossible to save them. In six weeks' time, with local treatment only, a cure was completed, and up to this time, nearly four years, although the finger-joints still swell and the uric-acid salts still form in her throat, there has been no return of the pyorrhea.

Eight or nine years ago, at a meeting of the State Society, he clinicked upon the case of a dentist of this city whose teeth were all loose, the gums having retracted for an eighth of an inch, and pus flowing at the slightest touch. In a few weeks the disease yielded, and to-day teeth and gums are firm and sound.

Another case was of a gentleman whose pyorrhea was in a fair way to cure when the physician who was treating the patient for gout declared that the local treatment which the writer was giving the teeth could not possibly save them. The result was that the gout was cured ; the teeth, under the constitutional treatment, all dropped out.

Dr. Younger considers it fortunate that a knowledge of the etiology of this disease is not necessary to its treatment. Few surgical lesions are simpler of treatment, the most essential requisites being skill and manipulative dexterity. Unless every particle of tartar is perfectly and absolutely eliminated, the disturbing cause will not be eradicated, and the disease will in time return. The appreciation of tartar is not always easy, and requires a sensibility of touch not common to all men ; which is why many have failed to discover tartar when it existed, and have been led to suppose it had all been removed, or that there was pyorrhea without tartar. An acute sense of hearing also assists in determining whether the instrument is passing over the substance of the root or an incrustation.

Before attempting to remove the tartar, the teeth, the cervices, the pockets, and the calculus itself should be thoroughly sterilized, for which Dr. Younger prefers bichlorid of mercury, one to one or two thousand, used warm, with distilled water for the menstruum. The instruments also should be kept in the sterilizing fluid while laid out for use. Begin with one tooth and stay by it till every particle of tartar is removed, even if it takes the whole time of the sitting, and as fast as it is removed wash out with the warm fluid, using a delicate platinum-pointed syringe. Otherwise minute pieces will adhere to the raw surface of the gum, and prevent the establishment of the healing process. In very deep pockets a little lactic acid may be used to dissolve the diseased portion of the alveolus, and any minute fragment of tartar which escapes the instrument. After the *débris* is all washed out, drop in a little tincture of iodin or solution of chlorid of zinc, three and one-half drachms to the pint of water, to stimulate contraction and granulation and induce reattachment of the alveolar tissue. If this does not occur, a wad of cotton saturated with liquor ammonia rubbed over the surface, washing out immediately with warm water to prevent escharotic effect, will remove the mucous membrane, and give opportunity for the healing process to be set up. If the gum remains flabby, inactive, and indolent, resort to acupuncture. If the alveoli have been destroyed, tie the roots together by passing a threaded needle through the gum and between the roots, avoiding the use of too much force.

The reason for completing the removal of the tartar from the tooth at one sitting is to prevent interference with the healing process when once set up. By the subsequent use of antiseptic washes until the healing process is entirely accomplished, he has succeeded in curing the most desperate cases of pyorrhea alveolaris, restoring to perfect use teeth which had been for years worse than worthless. The only condition in which he had failed, was where there was a dead pulp in connection with an incrusted apex, a condition found almost exclusively in the palatal root of the superior molars. As the remainder of the pulp is usually healthy, his treatment in these cases was to open into the roots, remove the pulps and fill, then amputate the palatal root, and grind off the articulating surface of the crown immediately over it so as to throw the pressure of mastication upon the buccal roots.

The paper then passed to a review of the evidence presented by Dr. Peirce on which to establish the theory of the gouty origin of pyorrhea alveolaris, concluding with the following summary of the case as Dr. Younger sees it :

In favor of constitutional (gouty) origin,—

1. That pyorrhea alveolaris is found in some persons afflicted with gouty diathesis.

2. That traces of uric-acid salts are found in the calculi of some of the people so afflicted.

3. That the irritation in the gums and around the teeth, and the discharge of pus, are modified by constitutional treatment.

Opposed to this view we find,—

1. That pyorrhea is found in persons having no constitutional cachexia or diathesis.

2. That if it were of constitutional origin it would be found in all, or nearly all, having the gouty disposition.

3. That the amelioration of the irritation by constitutional treatment is what would occur in any local irritation when the system was placed in a state of health.

4. That if pyorrhea were dependent upon the gouty diathesis, deposits from the saliva would also be impregnated with the urates.

5. That if it were of constitutional origin, constitutional treatment would be necessary for its cure. Instead, local treatment is found sufficient for its complete eradication, notwithstanding the constitutional trouble is continued in undiminished force.

6. That in all cases of pyorrhea alveolaris we find a connection between the calculus and the cavity of the mouth, which would not necessarily be so if it were the result of a constitutional pathological condition.

In addition to this, Dr. Van Woert asserts that the disease is communicable by infected instruments, which, if true, would prove a very strong argument against the theory of constitutional development.

Dr. C. S. Lane, Oakland. These papers are of great interest to those of us who are in active practice and meeting with cases of the characters described every day, and striving to overcome the conditions as we find them. The difference in the positions taken by the writers is an evidence that great minds do not always see things in the same light. One thing that struck him practically in this disease is that in some cases the condition can be overcome by local treatment ; by a thorough removal of the deposit the way is paved for a thorough cure. In some instances the cure is not so thorough. He had always striven to be very careful in the local treatment of this disease, and yet he found some cases where he could not put a stop to the suppuration, more especially in diabetic patients. He had one case now under treatment which had been in his hands over three years, and he had carefully watched the reported discussions on this disease by the leading practitioners, and though he had tried everything that has been suggested, he had been unable to arrest the progress of the disease ; so that he did not think in this case the cause could be considered due to a local condition, or that its persistence was due to any lack of proper sanitary conditions or local surgical treatment. Many cases of pyorrhea alveolaris can be treated locally successfully ; but there are others, especially among patients with diabetic troubles, where merely local treatment will not avail.

Dr. Younger said a case which occurred lately in his practice was called to mind by the remarks of Dr. Lane. A lady, in an anemic state, presented just before an expected six weeks' banishment from the pleasures of the world, with pockets discharging pus around several of her teeth. On careful examination a slight rim of tartar was found near the alveolar process, the disease having progressed in one of the teeth to within an eighth of an inch of the apex. This tooth was so loose that every breath waved it to and fro. He spent one and one-half hours on each tooth, carefully removing every trace of the deposit, and the disease was cured. Iodine was used in the treatment. One thing to be borne in mind in the local treatment of these cases is that plenty of time must be taken to each tooth ; otherwise you will fail. He thought that in the disinclination to do this is the cause of failure frequently. Then, again, it is necessary to have the natural touch that will enable one to know absolutely when the removal of the deposit is accomplished. He knew of no other reason why he was successful in the treatment of these cases than the possession of this touch, and the taking of the necessary time to do the work thoroughly. He claimed to be honest in the opinions he expressed, and that the ground he had taken was for the benefit of the profession. One reason why he had given the clinical treatment of pyorrhea alveolaris in detail is because he believed the cure is to be found in the careful manipulation of the instrument point, rather than in high scientific theories. He had also received letters from different parts, among them Bombay and Crakow, asking how he treated pyorrhea, and this seemed a fitting opportunity to give a general reply.

Dr. John C. McCoy, Santa Ana, asked Dr. Younger how he kept patients still for one and one-half hours.

Dr. Younger. By not hurting them. I obtund the sensibility of the tissues so as to cause only the minimum of pain.

Dr. Russell H. Cool, Oakland, had seen Dr. Younger operate, and his fingers are certainly sensitive. As he says, the proper removal of the deposit in pyorrhea alveolaris requires delicacy of touch ; the deposits are tenacious, and you must take whatever time is necessary to remove them. He thought it impossible, years ago, to cure this disease by local treatment alone, but he had seen cases so cured by Dr. Younger. He mentions warm water in his description of the treatment. He should have said hot,—at least as warm as the patient can bear, in connection with the bichlorid. Pyorrhea does not spring up in a night, and he had noticed, in young patients especially, a single pocket, to dislodge the deposit from which requires but little pushing. If neglected, however, in time it spreads from this incipiency till it involves several teeth. The successful man is he who treats the disease in its incipiency, without waiting till diabetes is established and the man is on the verge of the grave. You sometimes find in these cases a little abscessed cavity along the course of the pocket. A surgical opening will give room to medicate and treat this.

[Dr. I. N. Demarest, Santiago, Chili, was here introduced to the section, but he excused himself from making any remarks.]

Dr. G. S. Dean, San Francisco, would ask Drs. Younger and Cool, and perhaps Dr. Dunbar also, who had referred to the occurrence of an abscess between the gingival border and the apical space, whether they mean an actual abscess?

Dr. R. H. Cool said that he meant a sinus containing pus. In one case which he recalled, there was such a sinus on the labial surface of one of the teeth. By cutting through the alveolar plate, he opened into it, and then treated the same as any other abscess.

Dr. Dean wanted more testimony. Abscesses which are not apical we may perhaps call gingival abscesses.

Dr. Eugene S. Talbot, Chicago, said that both sides of this question—the local and the general—had been heard in the papers which had been read, neither of which, however, classified the various forms of pyorrhea alveolaris. He had certainly seen three different conditions which properly come under this name. First, there is the local deposit from the salivary glands ; then the serumal deposit, directly from the capillaries ; and third, a condition which he classed as constitutional, because there is no deposit whatever. He could not harmonize this last with Dr. Younger's conclusions. No matter if he doesn't hurt the patient, and no matter if he does take one and one-half hours to each tooth. Take a case of serumal tartar. If Dr. Younger can remove all the deposit, the speaker could not. He did not even know when it was all removed. Take a mouth in which there is a set of good, sound teeth, but in which this disease has affected the second molar to within one-eighth of an inch of the apex, the tooth being in consequence quite loose, while others are just beginning to become loose, from the effects of serumal tartar. We will clean that loose tooth thoroughly. We find the ends of the roots exposed, and the tooth itself held in the process by one root only. We clean it as well as we can, and in one month's time the patient comes back with the tartar extended all around the mouth. If we remove that loose tooth, treat as before, and watch the case, we can save the other teeth ; but as long as that loose tooth remains in the mouth it forms a nidus or rallying-place for the destructive forces. He had had that experience over and over again.

In the third condition to which he had referred, there is no deposit. He had seen cases of this kind where the teeth were loose, and he told patients from the start that nothing could be done by local measures, and he simply treated them constitutionally. They become built up, and the trouble abates ; then they stay away for two or three months, and come back all run down, with the old condition renewed. He had a patient who for fifteen years had been going through this experience, and he had told him that the only permanent relief would be to have his teeth extracted and an artificial set made. He had had other cases where the condition was inherited,—not the pyorrhea, but a predisposing condition of the system, which was handed down from generation to generation. As long as we practice dentistry as we do to-day, we give evidence that we don't know the principles underlying this disease. We have got to get a better knowledge of it. He believed pyorrhea alveolaris was a constitutional disorder, and that it was not due to uric acid in the system, but that the liver is the cause of it, and we have got to get down to treating that before we can master this disease. It arises from an inherited condition of the liver, and not until we know more about the treatment of the liver than we now do shall we know how to really cure pyorrhea.

Dr. Younger. Dr. Talbot claims that we are as ignorant about pyorrhea alveolaris to-day as we were twenty-five years ago. He would like to know what is known in medicine about, for instance, the function of the spleen. He would like to know what the medical profession has taught us about the origin of disease. He thought we now knew a great deal more about pyorrhea than we formerly did, and that we are able to treat it better.

Dr. Bonwill said that he did not like to repeat here what he had just said before the Odontological Society of Pennsylvania, where the subject was recently discussed. The majority of dentists don't know how to treat pyorrhea alveolaris. He stated his ideas two years ago in combating the idea of a calcic diathesis being the cause. He agreed with Dr. Younger in everything he said, but went a step farther than he did. Dr. Younger looks at the matter in a common-sense light. Nothing shows more plainly the uselessness of the dental profession as an appendage to the medical than this one subject. Dr. Younger sees a phenomenon—tartar on the roots of the teeth—which is the true cause of pyorrhea. He had had forty years' experience in the practice of dentistry, and he should be ashamed to have a case of pyorrhea in a mouth of which he had the entire control, because he would consider it his own fault. In forty years' practice he had not had a single case of a regular patient that had pyorrhea. There must be perfect cleanliness. Dentists too often neglect this first important requisite of cleansing the teeth and keeping them clean. The first thing before daring to touch a tooth to operate upon it is to see that the mouth is clean. Half of his cases of this disease were the failures of other men. He recalled the case of a patient who came to him after consulting a number of medical men who told him he would lose all his teeth. Three of them were in fact so far gone that they had to be extracted, but the others were saved. If these teeth are cleansed one by one, taking away all the dead tissue, the same as Dr. Younger does, cutting off the superabundant gum and cleansing thoroughly, they will get well. He had never yet, in forty years, given a patient constitutional treatment for this trouble. If, after having put the teeth in proper condition, patients are taught proper habits with regard to their teeth, there will be no return of the disease. He cleanses the whole upper set, if at all affected, at once, even if it takes the whole day ; cut out the superabundant gum, and don't meddle with nature after giving her a chance to do the work of repair. The gums will again hug up to the teeth. For treatment, there is nothing better than creasote, and he now uses carbolic acid, pure and not diluted. He attributed much of the cause of pyorrhea to bad dentistry. In most every mouth not under the regular care of a dentist it will be found that teeth have been extracted in early life ; or they are cut apart on the approximal surfaces and filled with flat fillings, pushing away the gum to make room. He did not believe in the gouty-diathesis theory, because it does not explain all the cases. Overhanging fillings at the cervix, amalgam fillings that their author ought to be ashamed of,—crude and rough as they are,—will destroy the membrane around any tooth. Gold crowns which are not fitted properly or finished fine at the edges are also factors in this disease. Then the rubber-dam must be tied on or held up beyond the gum-margin, and is another cause of trouble at the cervix. There are many other causes which may help to originate this disease, but those mentioned, the speaker thought, were enough to give his ideas. He proclaimed himself a crank—on articulation, for instance. If there is anything which helps out in these cases, it is seeing that the articulation is correct. He always takes an impression, and then, knowing the law of articulation, with a little study he could see just where to touch the teeth and correct any deficiencies. He was against the principle of the so-called gouty diathesis, and in treating teeth he never cut away too much, but preferably too little.

Dr. John C. McCoy, Santa Ana, read a paper entitled "The Teeth of our School-Children: What can be done to Save Them?"

Dr. McCoy characterized the ignorance on the part of parents and the neglect on the part of children who know better as one of the wonders of the nineteenth century. In one school of seven hundred pupils, he ascertained by personal inquiry that of five hundred between the ages of ten and eighteen years fifty cleaned their teeth twice a day, two hundred and seventy-five used a brush sometimes, while one hundred and seventy-five did not own a brush ; of the other two hundred in the primary department, from six to ten years of age, the teachers said they did not think there were ten children who used a tooth-brush. This school was not exceptional in this matter, as further investigation demonstrated. If any difference, it was in advance of most schools in percentage of clean mouths, as well as neat clothes and bright faces. Where there is so much neglect and so little real care of the mouth, it is not at all strange that the first permanent molars have to be sacrificed daily.

The school mentioned where only fifty pupils out of seven hundred made any pretense to regularly care for the teeth, shows what a field for instruction and training every teacher has. The children's teeth must be saved. Prevention through cleanliness and proper care is the only way possible and practicable to limit the wholesale destruction. The dentists of America have done much to educate and train our citizens in the care of their teeth. We must do more, and in order to multiply our usefulness we must solicit the aid of our public-school teachers, through whom we can reach and train millions of children in the proper care of the teeth, and insist upon the practical carrying out of the instructions at home. With pupils so trained through the various grades of school, we would see men and women with better teeth than the average American of to-day.

As to the way to bring the subject before the educators of the land, he hoped this association would indorse the plan, and so give prominence to its importance. Let the dental and medical press advocate it, and each state dental association appoint a committee to arrange a manual on the care of the teeth and induce the State Board of Education to adopt such manual as a text-book for teachers, who should be required to pass an examination upon its contents and to carry out its instructions in their respective schools, so that in future examinations of schools on the subject of oral hygiene, instead of only fifty out of seven hundred being found to regularly clean their teeth, there will be not more than fifty careless ones in a thousand.

Dr. Younger. Dr. McCoy is quite right. If the school-children's teeth are properly attended to, there will be no pyorrhea. In such an event, it would be as effectually stamped out as inoculation or vaccination stamps out smallpox.

Dr. Van Orden was reminded by Dr. Bonwill's remark of the number of first permanent molars which are sacrified. He had with him the casts of a mouth taken within a week. It was a nice mouth, and the patient was a nice lady, who was willing to give every care to her teeth, but nearly all the molars were affected with pyorrhea, while the incisors, cuspids, and bicuspids were free from it. The destruction of the normal occlusion by the extraction of the first permanent molars might be a partial clue to, or at least an element in, the development of the pyorrhea, though he was very well satisfied to withhold his opinion on the subject.

Dr. Dunbar. Dr. Talbot may be able to give us Dr. Ottofy's results in the examination of children's teeth conducted by him some years ago.

Dr. Talbot. I cannot give the results.

Dr. Dunbar. It is a good plan, but it involves considerable labor on the part of the enthusiastic practitioner. The laity are not particularly given to helping work of this sort; but some expression on the part of this body might form a basis for its inauguration.

Dr. McCoy. If the State Boards of Education could be induced to act, a law could be passed, and the care of the teeth could be taught in the schools, the same as other studies.

Dr. Talbot approved the idea advanced, and concurred heartily in its sentiment; but reform in keeping the teeth of school-children clean could not be brought about by having the teacher in the school talk about it. He thought the text-books for the reading classes should be changed from the stories they now contain to something about the make-up of the body. He regretted Dr. Van Orden's remark, as he did not think there was a dentist who now approved of the extraction of the first permanent molar. Dr. Davenport has well shown the evils of the practice. They are situated just at the principal point of mastication, and if extracted the articulation is broken up and irregularities are caused. Take the case of a bright child whose teeth have not been properly cared for till decay sets in, so that the first permanent molars have to be extracted. This is done, the teeth are fixed up, and the child passes out of your sight for a year, when it returns with the teeth in bad shape, decay showing around the fillings and new cavities formed. What shall we do? The food consumed by the child all seems to go to nourish the brain, and the other tissues suffer in consequence. It is not infrequently the case that young persons away from home, under such circumstances, develop consumption before their condition is observed.

Dr. Van Orden said that Dr. Talbot was in error in classing him with those who approve of the extraction of the first permanent molar. He had experienced the evils of the practice in his own person, and was opposed to it.

Dr. Younger was glad to hear that Dr. Talbot was mistaken in the inference he drew from Dr. Van Orden's remarks, because he thought it almost criminal to extract a first permanent molar. It takes the burden of mastication up to the twelfth year, and if removed, the second molar through the *vis a tergo* comes forward, its back surface bearing the brunt of the work, so that mastication is not properly performed, and all the other troubles of malarticulation are engendered.

Dr. McCoy would like to see a trial made of the method suggested by him, in California.

Dr. F. O. Jacobs, Oakland. One grand difficulty in treating the first permanent molar is to get patients to understand the difference between it and the deciduous teeth. He had never been able to get them educated to understand that it belongs to the permanent set. Would it not be a good idea to get the teachers to instruct the children on this subject, and thus reach the parents, who usually bring the child to the dentist when this tooth is almost ruined, and when we suggest to them that we ought to try to save it, say that it makes no difference ; it's a first tooth ?

Adjourned to 2.30 P.M. to-morrow.

(To be continued.)

MIDWINTER FAIR DENTAL CONGRESS.

(Continued from page 651.)

FIRST DAY—*Evening Session* (*Continued*).

DR. D. R. WILDER, Los Angeles, read a paper entitled "Orthodontia," in which he stated the philosophy of the movement of teeth for the correction of irregularities, considered the advantages and disadvantages of the various devices and systems brought forward for the purpose, and described "A New Method of Treating Irregularities."*

Adjourned for the day.

SECOND DAY.

The morning session was devoted entirely to clinics, of which a full report will appear later.

Afternoon Session.

The congress was called to order at 2.30 P.M., President Younger in the chair.

Calling Vice-President DeCrow to the chair, Dr. Younger read his address, of which an abstract follows :

After expressing his pride and gratefulness that he had been honored by the presidency of the congress, Dr. Younger adverted to the presentation by Dr. Teague of California's claims to recognition among dentists, reiterating that within the last thirty years California has contributed more to the field of dental practice than any other state or any other country. The pioneers who came to the Sunset Shore were men of no common mold. Wealth of ideas cannot spring from a narrow mind.

Dentistry requires for its successful administration several diverse qualities of mind,—the talent that would make a good physician, the talent that would make a good surgeon, the talent that would make a good mechanic, the talent that would make a good artist.

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*A full description of Dr. Wilder's apparatus, which is patented in the United States and Great Britain, will be printed in a future issue of the DENTAL COSMOS.

We are not to look at the teeth simply as objects to be extracted, filled, or replaced by artificial dentures,—that is simply the mechanical portion of our art; nor from the artistic point, which confines their effect to beauty; nor from the more practical side, their use in mastication; but as organs having subjective and objective relations with the whole animal economy. There is a *terra incognita* between the practitioners of dentistry and medicine, which pioneers from both ranks are exploring in individual effort; but they have established the wonderful sympathy between the eyes, ears, stomach, brain, and nervous system and the teeth and gums, and the pathological reactions when the latter are in an unhealthy condition, proving the necessity of the most absolute conservatism in dentistry. The diseases due to ill condition of the oral cavity are much more serious than is at present recognized. The presence of tartar alone exercises a most pernicious influence on many disorders, especially those of zymotic origin, and deserves serious inquiry by medical men. The every inspiration of a person so affected goes to the lungs freighted with the poisonous matter contained in his own mouth. How can such a person get well, and may not tartar be in itself sufficient cause for septic trouble, or even turn the scale in the delicate balance between life and death?

The connecting link between surgery and dentistry has now been established; and may we not hope that in the knowledge already acquired of the effects upon the system of dental disease, dentistry will be put on an equality in its relative capacity with surgery and medicine, or any other profession?

It was left to America to construct it into a learned profession, to found colleges for it, to graft it into universities, and form it into associations for the good of mankind. The nineteenth century, the most wonderful the world has seen, has been the age of revolution and evolution. Dr. Younger then referred briefly to a few of the more prominent developments of the century, as an outgrowth of the education, the discoveries, the ingenuity of which came the birth of the profession of dentistry.

No one can spend an hour at a session like this without advantaging himself and his patients. No one but may stumble upon a truth that has eluded the most learned, and it is here that he will tell it. The uneducated dentist is often the more skillful and practical, because he has had to feel his way along the foundations, and in so doing has discovered gems that the theorist overlooked. The great advantage of these associations is that they bring together all classes of the profession, all orders of mind and practice, and in the papers, reports, and discussions, ideas and facts are brought out that might otherwise remain unknown.

Association develops thought, lessens rancor and jealousies, clears misunderstandings, awakens interest, forms friendships, and so unites and advances the profession. The man who remains away from these sessions, "because he can learn nothing," is a fool to himself, and he will find himself passed in the struggle for superiority by those he most disdained. Let each one feel that he is an integral part of the profession, a working and necessary factor, bearing a certain responsibility to purify and elevate it, and that by earnest work, skill, and ability, he may reach the topmost round of the ladder. Let each say what he has to say in the pure spirit of professional interest. Let us be manly, truthful, earnest, and inquiring, and as we do our part with integrity of purpose, so shall we be blessed in our mission, those coming to us be benefited, and our profession glorified.

As an instance of the advantage of collaboration, Dr. Younger then referred to Dr. Pierson's use of a rubber sheet over an isolated tooth years before Barnum's discovery. But this man, who had immortality within his grasp, lost the crown because there were no associations, and the profession was delayed nearly a decade in the application of this great aid to perfection. Perhaps the association of so many earnest minds here will evolve something that will advance our profession twenty years ; perhaps some truth may grow out of this convention that will immortalize it.

Dr. E. S. Talbot, Chicago, read a paper entitled "Science in Dentistry," of which an abstract is here presented :

The writer stated the purpose of his communication to be to call attention to some aspects of the question considered in the thoughtful editorial on the Scientific Status of the Dental Profession which appeared in the DENTAL COSMOS for April, 1894, which seemed to him to have been left partly undeveloped. Dentistry in America has so far been a natural growth, developed from the needs of our people. The art of dentistry owes more to America than to any other country. Here also the first systematic efforts at dental education were made, and the first beginning of the elevation of dentistry from an art to a learned profession. The amount of human suffering that has been made unnecessary by the inventive genius of the dental profession of this country is incalculable, even when not taking into account its share in the giving of the priceless boon of surgical anesthesia to the world.

The natural evolution of things requires a certain change of face on the part of the dental profession, if it is to hold what ought to be its proper place in the scientific world and in the estimation of the public. In creating practical dentistry as an independent profession, we had narrowed our field and separated ourselves from those who should recognize us as co-workers in a common field of usefulness. Dental surgery is really a specialty in the broader field of medicine. There is no reason why a surgeon who limits his practice to the oral region should be less of a physician than one who confines himself to the eye, the nose and throat, or the pelvic organs ; yet a dentist ranks lower in popular estimation than a physician or surgeon,—a view which has also received judicial sanction.

The time has come for us to take a higher stand. The world recognizes the manual skill and invention of American dentists ; but, as Dr. Kirk says, "our transatlantic *confrères* produce an aggregate of scientific work in dentistry which far exceeds the output in this country in the same line." If this continues, it is inevitable that American dentistry must fall still lower in the estimation of scientific men and in the popular estimation. There is no good reason for this. Americans are not intellectually behind their co-workers in other lands, the ability to do scientific work is not lacking, our clinical facilities are as extensive as those abroad, and our powers of observation certainly not inferior. The real difficulty is the lack, hitherto, of the scientific spirit, and of what may be called the scientific atmosphere. Nevertheless, this is coming, if it is not here. Could the small band of ''workers in the dental ranks who find or take time to investigate problems in dental science which have a wider scope and broader application than the direct utilitarian'' impress the whole of the profession with a little of their spirit, the condition complained of could not exist. The trouble is that we have too much adopted business success as our aim, and have not kept sufficiently in mind that '' wisdom is the principal thing,'' and that with all our getting we should get understanding.

If we wish our profession to stand high in this, we should follow the lead of the regular medical profession, which is now raising its qualifications, and which has always had an ethical ideal which has kept it with the traditions of a learned profession. In all our great centers are large bodies of physicians the equals of any in the world, and the time is coming when the centers of medical education in this country will turn the tide to some extent, and students will cross the Atlantic to sit at the feet of the masters on this side. What is needed now is that American dentistry should raise its standards and make its reputation as a scientific specialty of medicine, not a manual art. To make dentistry a recognized specialty in medicine, we will have to demand a medical education in its broadest sense for dentists. If the dental profession in any state would work for a law requiring every one entering the practice of dentistry after a certain date to show proofs that he had received a liberal and medical education, and to stand an examination not only in dental manipulation, but also in the general principles of medical science, its practitioners would rank with their medical *confrères*, and share the advantages of wider association and a broader field of work and usefulness. They could with great advantage do a large share of the facial surgery which now passes to other hands. What our people most generally lack is not the power of observation, but the education that will enable them to know what to observe. This can only become general with a higher mental and scientific education than has hitherto been deemed essential ; for, however observant and ingenious a man may be, unless he knows what others have already done, he must waste his energies in going over their work, and the publication of his results gives him credit only for ignorance. Even when really original observations are made, this defective knowledge stands in the way of due credit being given to their author. Valuable facts may be ignored or overlooked because published where no one looks for them, or because hidden among a mass of comparatively worthless material. A German author recently, in alluding to views published by a New York physician some eighteen or twenty years ago, which within a few years have revolutionized opinions the world over in regard to a class of ailments, explained the neglect they had met with in his country by the statement that they originated in America, where medical science had been regarded as still in its Kinderschule.

If American dentistry is to keep the rank it has won in the practical development of the art, in its present more scientific phases, it must raise its standard of culture and require of its practitioners a higher grade of acquirements, both general and professional. The writer sees no better ideal for it than that of being considered as a specialty in the great field of medicine. We must cultivate a liberal professional rather than a commercial spirit. We may not be enabled to realize the ideal at once, but we can work toward it, and it will be attained if we desire it.

Dr. Geo. H. Chance, Portland, Oregon, read a paper entitled "Dentistry in its Relation to General Medicine," the argument of which is presented :

Whatever may be the views of dentists, medical men, with perhaps few exceptions, hold that dentistry is a mechanical art only, and that dentists as members of a mechanical craft are not entitled to professional recognition from medical men. The purpose of this paper is to show that the dentistry of the present is both a science and an art, as well as a liberal profession. Dr. Chance then sketched the early history of dentistry, by references to the writings of Herodotus, Galen, Fallopius, Eustachius, and Ambrose Paré. In 1703, scraping and cleaning teeth and the making of artificial substitutes seem to have been done by silversmiths and jewelers exclusively. Later in the eighteenth century, John Hunter, the father of the English school, and other medical men, English and French, wrote upon the subject, rather from the philosophical and physiological than the practical standpoint. In the early part of the present century, the French seem to have taken the lead in dental matters. To them we are indebted for porcelain teeth, and a Frenchman, Le Maire, introduced the practice of dentistry into America, coming over with the French forces which joined the continental army in the war of the Revolution. Following Le Maire was an Englishman named Whitlock.

The first native American dentist was John Greenwood, who, as everybody knows, carved artificial teeth of ivory for George Washington. Then came other dentists, in New York, Philadelphia, and Baltimore, whose practice was confined to filing, cleaning, and extracting teeth, and providing substitutes, mostly of ivory.

Dr. Hudson, of Dublin, Ireland, who located in Philadelphia early in the present century, is believed to have been the first in this country to direct his attention to the care of dental diseases and to arresting the progress of dental caries. In 1820, there were about one hundred dentists in the United States ; in 1830, about three hundred, of whom, according to Harris, not more than one-sixth were properly educated. Ineffectual attempts were made to have the medical men adopt this branch of the healing art, but they would none of it. Meeting with nothing but antagonism from the medical profession of the day, the fathers of modern dentistry founded the Baltimore College of Dental Surgery in 1839, which conferred for the first time the degree of Doctor of Dental Surgery, and established American dentistry as an independent profession. In the same year they established the *American Journal and Library of Dental Science*, the first publication of its kind in the world. The next step was the organization of the society of dental surgeons.

This brief sketch shows that modern dentistry is not the outgrowth or offspring of the medical college, and that its degree is a new creation ; therefore dentistry is unlike any other so-called specialty in general medicine. Yet no one will deny that dentistry is a legitimate branch of the healing art, and that a certain part of the instruction must be the same as for the general practice; but the dental student must look to special schools for the information which will qualify him for practice. Even so late as 1890 the Census Bureau of this country endeavored to classify dentists with manufacturers, demanding of them a showing of the number of false teeth they had manufactured during the year.

As showing the estimate in which some medical men still hold dentists, Dr. Chance then quoted the editorial from the *New York Medical Record* entitled "The Defect of the Dentist," which he characterized as exaggerated and untruthful, and begotten of medical ignorance and professional phariseeism; which, however, should not surprise us when we consider that only seven or eight of all the medical colleges in the United States give any special attention to the teeth and their diseases, so that lack of technical knowledge makes the physician mistake effects for causes when the disease is of dental origin, resulting in much unnecessary suffering, and sometimes in loss of life. But with thirty-eight well-equipped dental colleges, with examining boards and laws for the protection of the public in nearly all the states, together with the ever-forward movement of the profession, the educated doctor of dental surgery need not feel abashed at an occasional snub from a shallow-pated M.D. While perhaps few of us could give the origin and insertion of every muscle of the foot at a moment's notice, or diagnose appendicitis as quickly as one who practices along those lines, we know what we want to know, and the common-sense, educated physician and our intelligent patients know that we are keeping step to the music of progressive medical science and improved methods of treatment.

Modern dentistry, then, is in the broadest sense both a science and an art. As a science, it deals with a full and accurate knowledge of the dental organs, their functions, and the causes leading to pathological conditions whereby disease is engendered and function impaired or destroyed. As an art, its votaries are instructed in the various means for combatting dental and oral disease. So that it is safe to say that dentistry is a science applied to dental and oral surgery, and quite as safe to say that medicine, when stripped of its scientific adjuncts, major and minor surgery, is largely a system of guessing at probabilities in disease, with a fearful lack of harmony among the guessers. Are these to criticise the dentist and his methods, to gravely guess that dentists are not sufficiently sterilized to prevent infection from syphilitic patients who apply for treatment of the oral cavity? Then there is the guesser who guesses that dentists ought not to use amalgam lest the potency of his fifteenth dilution may be destroyed by contact with wandering mercurial spooks escaped from between the meshes of the amalgam plugs.

Dentistry has discovered the cause and is daily successfully treating ninety per cent. of all the cases of so-called "facial neuralgia" whose victims apply to the dentist for relief. It has also vastly improved upon the methods formerly in vogue by the medical profession for the treatment of tumors of the oral cavity, as well as fractures of the jaws; has aided and abetted the efforts of the aurist and oculist. It was a dentist who gave to the world, without fee or reward, that boon of boons, anesthesia.

The ancient superstition coming down from the times when the "medicine man" was also a prophet still clings to an extent about the physician, whose services are sought for his supposed skill in the mysteries of medicine, while the dentist is employed not so much for his technical knowledge as for the special labor he is expected to perform. So that it is not necessary that we should wear the badge of medical servitude, for dentistry is the product of a higher, more advanced form of civilization; a scientific, independent profession, developed by master minds of a more recent generation, and not a medical legacy.

Nevertheless, the words of the *New York Medical Record* show that medical men are at last becoming interested in dental matters. While we have made mistakes and have defects, and therefore do not deserve to "wear the crown," we are constantly improving by avoiding old errors; admitting our shortcomings, we have had little use for the sexton's "pick and spade," which it is hoped will be a source of great consolation to one so thoroughly "sterilized" as the editor of the journal named. We shall keep up our original investigations, hoping and expecting to keep in touch with the onward march of science in all other departments of human knowledge.

Dentistry, like medicine, is here to stay. Both are needed, as intended, as instruments for the relief of physical suffering, for the prevention of diseases, but such results can be reached in certain cases only in proportion as physician and dentist are willing to consult and co-operate. This requires an education which fits each not only for practice in his particular, but which overlaps other branches of the healing art. Three full years of study and attendance on three full courses of lectures in each are required. It is clear that if it takes as long to graduate the student in dentistry as in medicine, there must be something more to learn than the average physician with his present limited knowledge of the dental organs is prepared to admit. The coming medical man should be better informed upon the teeth than to-day. It is therefore respectfully recommended that this congress appoint a committee to draft suitable resolutions setting forth the facts and addressed to the medical profession at large, requesting their co-operation with the dental profession in urging medical colleges which have not already done so to add to their curricula the chair of dental histology and pathology, to the end that graduates in medicine may be better prepared to consult and co-operate with graduates of reputable dental colleges in the surgical treatment of the complex diseases of the oral cavity.

Dr. Samuel E. Knowles, San Francisco, in opening the discussion on the subject treated of in the two papers, said there should now be no conflict between medicine and dentistry, whatever there might have been formerly. Since he had been in practice, he had occasion to change his views entirely on this subject. Twenty years ago the dental colleges were so lax in their requirements—one course in the college and five years' practice being all that was necessary to secure the degree D.D.S.—that there was good cause for distrust on the part of medical men. The medical profession have always been jealous of their good repute, and they have tried to live up to a higher standard of scientific attainments than this necessitated. He did not blame the physicians for not affiliating with dentists under these circumstances. The fault was entirely on our side. If one wishes to be recognized as a medical man, if he selects a special territory, he must first be graduated in medicine before entering the special field. He had formerly hoped and expected that the dentist would in time first be graduated in medicine, but now the schools of dentistry have been so much improved, particularly by the requirement of an entrance examination and three years' attendance upon lectures, that they would seem to give all the preparation required. The course in the dental college is largely practical; in the medical school it is largely theoretical. When a man has graduated in medicine, if he desires to take up the specialty of dentistry, he has nearly everything to learn; the dental graduate is in pretty fair condition to carry on the business. He does not know all there is to learn about dentistry, but he does know how to manage the ordinary cases of practice. The office boys who attend the dental college for a single term and come forth full-fledged dentists are going out of existence. We will be recognized by the medical profession not as physicians practicing a specialty, but as practitioners of an art or science of equal value. He would have to give up the idea that dentistry would be a part of medicine. At present we are in a state of doubt, whether to affiliate with medicine or to stand alone; but the good work done by specialists on both sides of the line points out the fact that our roads diverge. He thought the physician ought to be taught enough of dentistry in the college to distinguish between proper and improper practice. Professional people ought to be guided by an entirely different code of morals from that which governs men in commercial business. There should be absolutely no deception between the dentist and his patient; the dentist should under no circumstances deceive the patient, or tell him to do what he ought not to do. If a medical man were to do this, he could be disciplined, and so could a lawyer. We have got to have better men in the profession than can be looked for under the old system. A great many entered who were not of proper character or attainments; but the entrance examination, impartially administered, will keep out the wrong ones. At the door is the place to decide whether the man is a promising or an unpromising candidate for professional honors.

Dr. W. G. A. Bonwill, Philadelphia, did not see any relation between dentistry and medicine. It takes as much time for a man to learn dentistry as to learn medicine. In spite of the fact that he himself had been educated at Jefferson Medical College, he preferred to stand by dentistry because it is certain in its procedures and its results. We have within ourselves the power to make ourselves as distinguished and respected as a profession as the medical men. Prof. S. W. Gross, referring to this idea, said if we take out the distinctive degree, stand by ourselves, perfect ourselves in some of the other sciences as we had in the practical department of dentistry, the world would recognize us. No medical man within the speaker's knowledge had ever yet been found who knew anything about the practical part of dentistry, and their ignorance about the surgery of the face and jaws is appalling. The amount of vandalism perpetrated on the face, in the name of surgery, before the surgical engine was brought out, was scarcely to be credited. Now, with the engine, the operations that before scarred the face with unsightly blotches are performed from within the mouth. All we have got to do is to be honest, to possess character and moral tone, and medical men will be compelled to notice us. It takes time to do all that is required, and the time has not yet come for us to be recognized as we will be.

The gentleman from Oregon mentioned amalgam in his paper. Dr. Bonwill had used amalgam, and he related instances of alleged galvanic action and other evils which patients had attributed to its use, when a little investigation disclosed some other cause for the troubles complained of. He wanted to see a single case in which amalgam does these things, and he would concede the point. Of course, if it is put too near the pulp, it will do the business every time. Such ideas coming from medical men as have been referred to in this paper should teach us that we have no use for their recognition so long as they don't know enough to come up to our level as our peers. We practice something which is more scientific than anything they do.

Dr. M. J. Sullivan, San Francisco, could see no reason why dentistry should not be recognized as thoroughly as medicine, provided it makes itself worthy of recognition. Physiology, anatomy, and chemistry, as taught in the dental schools, differ in no respect from the same sciences as taught in the medical schools; the difference is in the application. If a man fails to be recognized, it is because he is not worthy. Any dentist who takes the pains to educate himself, and is actuated by a desire to learn all that is possible to be known, will be recognized at his value. We are exponents of one branch of the healing art, the same as other specialists; if not recognized, it must be because we do not equal them in attainments, so that any one who is snubbed simply has none but himself to blame.

Dr. Chance wanted to agree with Dr. Talbot, and the difference between their positions was not so much as it seems. Truth is truth, though we see it from different standpoints. There is a good and substantial reason why we dentists differ from men practicing the medical profession. We were kicked out of the medical profession, or we should be part of it to-day. Again, did you ever know of a man practicing general medicine asking to join a dental organization? He had himself asked medical men to read papers before dental societies, but did you ever hear of a medical society asking a dentist to speak before it? There should be some recognition from both sides.

Dr. Talbot thought we should not try to raise dentistry up by pulling down medicine. There are too many cases where ignorant men are practicing dentistry for us to stand up as an altogether enlightened profession. He would like to know if the *Medical Record* is not correct in the main idea advanced in its remarks. As to dentists being invited to read papers before medical societies, it is done, in the East, at any rate. He himself had often been so invited. It depends on us entirely what position we are to occupy. Now, take the programs of the dental societies of the day and those of twenty-five years ago, and say what advances have been made. Take the subject of amalgam or gold filling. Is there anything new said on those subjects? Are the papers to-day any better than they were forty years ago? We are improving, certainly; but it is almost exclusively in a mechanical way. Dr. Kirk, the editor of the DENTAL COSMOS, has reached the conclusion that there is comparatively little science in dentistry as practiced, and that it needs an awakening in that direction. Take the papers that are read here. Don't they contain stolen ideas? Have they given credit for the thoughts of others which they use? A part of science is knowing who is the father of a given idea, and giving him credit for it. Can we do anything in the dental colleges to advance the scientific side of dentistry? He maintained that anything to advance the science must be done from the medical standpoint.

The subject was closed.

Dr. C. F. Metcalf, Sacramento, read a paper entitled "Duty and Progress," which was professedly written as a reminder of things known, but too often overlooked. The first duty of the dentist is the care of his health. A cool head, a steady hand, and a vigorous touch accompany a vigorous body. An important factor in the preservation of sound health is the cold sponge bath in the morning, which should be taken after vigorously rubbing the body and limbs with the bare hands, inhaling and exhaling long and deeply the while, until the blood is in good circulation. The benefits of exercise and proper food were also referred to. Incidentally, the advantage of training oneself to become ambidextrous was mentioned, and the comfort of mind which arises from the exercise of a proper amount of thrift.

It is all-important that we keep abreast of the times; no appliance or instrument is good enough if there is a better in the market. Economize somewhere else, never in the office. Make it attractive to yourself; it will be to others. The necessity of cleanliness of person and neatness of attire was enforced; above all, keep your own teeth immaculate. Gentleness of manner and firmness of mind are traits to be cultivated. A cool, intrepid assurance, with seeming modesty, takes with all.

No man is obliged to learn or know everything; yet dentists are under obligations, as professional men, to improve their understanding as far as possible. Skill we must have; yet success depends on good judgment; therefore the cultivation of the mind has everything to do with our success and happiness. A taste for choice literature once aroused, nothing else will ever give the keen enjoyment of good books. Meditation and studious thought on what we read gives us good sense. A life of learning cannot be a life of ease, yet it should be a life of pleasure. No man should adopt a profession unless he is resolved to study as long as he continues to practice. The good of the profession demands meditation and study. Devotion to our chosen profession should contribute largely to our happiness. To be happy we must have a thorough knowledge of what we ought to do, and conform the will to that knowledge; be content with things helpful and at hand, but in plenty fortify ourselves against want.

Progress should be the watchword of every man who has the good of the profession at heart. Every man who has made a success of any specialty deserves at least open recognition and the thanks of the profession. While it is usually found that one who makes a great success in any particular branch of dentistry has excelled by dint of patience, perseverance, and hard work, the weakest may have a gift which will benefit the profession. Let us not forget in the march of progress every revolution was at first a thought in one man's mind; every reform was once a private opinion. It certainly behooves every progressive dentist to identify himself with some dental society, to aid and abet, not only by his presence, but by an exchange of ideas and methods. Progress is our safeguard, for when (in our own opinion) we become oracles and ignore the opinions of our equals, we shall have passed the period of usefulness, and become an enemy to our chosen profession rather than a benefactor.

Dr. C. S. Lane, Oakland, in opening the discussion, said that we had been studying the nerves, the tissues, and microbes, and what not, and now we have manhood held up to our gaze, with all that makes a dentist respected. The trouble in attempting to speak to the paper is that it has said practically all there is to say, and who can say we are not advancing when we can have such a paper read by a dentist? Dr. Metcalf has said "cleanliness is next to godliness," and has given us a good moral lecture on the subject that we must have a sound mind in a sound body in order to be good dentists. He was glad to hear the paper, and he believed it would be at least as great a stimulant as a treatise on a more so-called scientific subject. He was a believer in the bath, but not all of us can stand it as prescribed by Dr. Metcalf. It is wise to have a proper regard for cleanliness of person, of instruments, and appliances, for we carry our atmosphere with us. There is room for a great deal of thought on this line.

Adjourned to 7.30 P.M.

(To be continued.)

NATIONAL ASSOCIATION OF DENTAL FACULTIES.

THE eleventh annual session of the National Association of Dental Faculties was held at the Hygeia Hotel, Old Point Comfort, Va., commencing Saturday, August 4, 1894; the president, Dr. H. A. Smith, of Cincinnati, in the chair.

The resignation of Dr. J. E. Cravens as secretary was accepted, and Dr. Louis Ottofy, of Chicago, was made secretary *pro tem.*

The following faculties were represented:

Baltimore College of Dental Surgery—B. Holly Smith.
Boston Dental College—J. A. Follett.
Chicago College of Dental Surgery—T. W. Brophy.
Harvard University, Dental Department—Thomas Fillebrown.
Kansas City Dental College—J. D. Patterson.
Missouri Dental College—A. H. Fuller.
New York College of Dentistry—Frank Abbott.
Ohio College of Dental Surgery—H. A. Smith.
Pennsylvania College of Dental Surgery—C. N. Peirce.
Philadelphia Dental College—S. H. Guilford.
State University of Iowa, Dental Department—W. O. Kulp.
University of Michigan, Dental Department—J. Taft.
University of Pennsylvania, Dental Department—James Truman.
Vanderbilt University, Dental Department—H. W. Morgan.
Louisville College of Dentistry—F. Peabody.
Southern Medical College, Dental Department—C. V. Rosser.
University of Tennessee, Dental Department—J. P. Gray.
University of Maryland, Dental Department—F. J. S. Gorgas.
Royal College of Dental Surgeons of Ontario—J. B. Willmott.

Columbian University, Dental Department—H. C. Thompson.
Northwestern University Dental School—G. H. Cushing.
American College of Dental Surgery—Louis Ottofy.
National University, Dental Department—J. Roland Walton.
College of Dentistry, University of Minnesota—T. E. Weeks.

The following schools were admitted to membership during the meeting:

Western Reserve University, Dental Department, Cleveland, O.—H. L. Ambler.

Western Dental College, Kansas City, Mo.—D. J. McMillen.

With reference to the application of Howard University, Dental Department, the Executive Committee recommended that in consequence of changes in and inadequacy of its dental department the application be rejected. The report was adopted.

The report of the Executive Committee recommending the admission of the University of Buffalo, Dental Department, to membership, was amended by the addition of the following clause, and then adopted: "When the honorary degrees conferred on Messrs. Southwick and Howard are returned to the university and revoked, and official notification of such revocation filed with the secretary of this association."*

The amendment to rule 5 offered by Dr. Hunt last year, making the rule read as follows, was adopted unanimously:

> "(5.) STANDING OF UNDERGRADUATES IN MEDICINE.—Undergraduates of reputable medical colleges, who have regularly completed one full scholastic year, having attended at least seventy-five per cent. of a five months' term, and passed a satisfactory examination in the studies of the freshman year, may be admitted to the junior grade in colleges of this association, subject to other rules governing admission to that grade."

The following new applications for membership, with their recommendations, were reported by the Executive Committee:

Dental Department, Cleveland University of Medicine and Surgery, Cleveland, O. Recommended by Drs. J. Taft and J. E. Garretson.

Cincinnati College of Dental Surgery, Cincinnati, O. Recommended by Drs. James Truman, T. W. Brophy, F. J. S. Gorgas, and J. A. Follett.

Birmingham Dental College, Birmingham, Ala. Recommended by Drs. H. W. Morgan and C. V. Rosser.

University College of Medicine, Dental Department, Richmond, Va. Recommended by Drs. F. J. S. Gorgas and H. W. Morgan.

Atlanta Dental College, Atlanta, Ga. Recommended by Dr. H. W. Morgan and the faculty of the University of Tennessee, Dental Department.

The amendment to by-law 4, which was offered by Dr. Hunt last year, was laid on the table.

The resolution offered last year by Dr. Sudduth, directing the addition of Latin and physics to the entrance examination, was also laid on the table.

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* The Dental Department of the University of Buffalo complied with these conditions on August 13, 1894, and is therefore admitted into full membership.—LOUIS OTTOFY, *Secretary*.

The special committee appointed last year to consider the matter of the vote of censure passed upon the Baltimore College of Dental Surgery reported, through its chairman, Dr. C. N. Peirce, recommending that no further action be taken. The report was adopted.

Dr. Louis Ottofy offered a recommendation, which was adopted, that all colleges, members of this association, shall increase the college course of 1895–6 to not less than six months.

The following resolution from the Executive Committee was adopted :

Resolved, That any college or colleges making application for membership in the National Association of Dental Faculties shall be required to secure and present to the Executive Committee the approval and indorsement of the board of dental examiners of the state (where such boards exist) in which such colleges are located, before their application can be considered.

The following from the Executive Committee was laid on the table :

Resolved, That we regard it as inconsistent for any member of a faculty of any college holding membership in this body to at the same time be a member of any state board of dental examiners.

The report of the *ad interim* committee with reference to charges preferred against the University of Maryland, Dental Department, was referred to the Executive Committee, which reported as follows :

"Your Executive Committee respectfully report that they find that the University of Maryland, Dental Department, in the reception of certain students did violate the regulations of this association, through a misapprehension of the rules, as it is interpreted by your committee that the regular sessions of all colleges close with their commencement exercises."

The report was adopted.

On motion of Dr. Guilford, it was ordered that rule 11, p. 12 of the "History" be understood to mean that students coming from a college not a member of this association will not be given credit for any time spent in such institution.

The annual dues were increased from $3.00 to $5.00 on motion of Dr. Cushing, the increase to take effect in 1895–6.

On motion of Dr. Truman, the special committee on preliminary examinations was instructed to have prepared by a competent person and present at the next annual meeting a list of questions of a standard covering every branch required in the grammar schools up to the point of admission to the high schools.

On motion of Dr. Abbott, it was ordered that each college should each year present its announcement, noting any changes, the secretary to note and publish all important changes in the annual report of the association.

On motion of Dr. Morgan, all the schools were required to comply with the rule regarding dissections.

On motion of Dr. Ottofy, a committee of three was appointed to revise the constitution and by-laws, with the further instruction, on motion of Dr. Truman, to drop the qualifying term "by."

The following were introduced, and under the rules lie over till next year :

By Dr. Peirce :

Resolved, That, in view of the recommendation of the Executive Committee, this association will require that all colleges, members of this association, shall extend the term of the session of 1896–7 and of succeeding sessions to not less than seven months each.

By Dr. Truman :

Resolved, That on and after the session of 1898–9 the regular session of each of the colleges belonging to this association shall be extended to four years.

By Dr. Ottofy :

Beginning with the session of 1896–7, the examinations conducted by the colleges of this association shall be in the English language only.

By Dr. Ottofy :

Beginning with the session of 1895–6, no college shall be permitted to retain membership in this association if it is conducted or managed, in whole or in part, by any person or persons who do not practice dentistry in accordance with well-recognized and generally accepted forms, generally known as dental ethics, or if they are owned in whole or in part by men or women who are engaged in disreputable dental practice, or if any college have upon its list of trustees, the faculty, demonstrators, or in any other capacity, any one who does not practice dentistry in accordance with the principles above mentioned. This shall refer to dentists only.

By Dr. Ottofy :

Beginning with the session of 1896–7, the following shall be the requirements for the admission of students to the colleges of this association :

a. A certificate of having successfully completed at least one full year's course of study in the collegiate department of any college or university registered by the regents of the State of New York as maintaining a satisfactory standard.

b. A certificate of having passed, in a registered institution, examinations equivalent to the full collegiate course of the freshman year, or to a completed three years' academic course.

c. Regents of the State of New York pass cards for any forty-eight counts.

d. A certificate of having passed the matriculation examinations of any university in Great Britain or Ireland, or of having completed a course of study recognized as an equivalent therefor.

e. A certificate of graduation from any registered gymnasium in Germany, Austria, or Russia.

f. A certificate of the successful completion of a course of five years in a registered Italian *ginnasio* and three years in a *liceo*.

g. The bachelor's degree in arts or science, or substantial equivalents, from any registered institution in France or Spain.

h. Any credential from a registered institution, or from the government in any foreign state or country, which represents the completion of a course of studies equivalent to graduation from a registered New York high school, academy, or from a registered Prussian gymnasium.

By Dr. Gray :

Resolved, That law 7 of the by-laws, which now reads "attendance upon three full courses of not less than five months each in separate years shall be required before examination for graduation," be amended by substituting "six" instead of "five," to take effect on and after the year 1896–7.

By Dr. Willmott :

Resolved, That at least twenty-nine months intervene between the beginning of the freshman year and the date of graduation.

The Committee on Text-books presented the following report, which was adopted :

Your Committee on Text-books would report that only two works of this character have been presented for its consideration :

One, a work on "Dental Anatomy and Pathology," by Dr. C. F. W. Bödecker, of New York, 700 pp.; and the other, a smaller and less pretentious work of about 75 pp., on "Operative Technics," by Dr. Thomas E. Weeks, of Minneapolis.

Both of these works are in press and nearly completed. The treatment of their subjects is full, clear, and concise, and the illustrations numerous, well executed, and for the most part entirely new.

Your committee would therefore recommend these two works for indorsement as text-books.

Suitable resolutions regarding the death of Drs. R. B. Winder and W. H. Eames were presented and adopted, and the secretary was instructed to communicate a copy to their respective families.

The following officers were elected for the ensuing year : Frank Abbott, president ; S. H. Guilford, vice-president ; Louis Ottofy, secretary ; H. W. Morgan, treasurer ; J. Taft, B. Holly Smith, and Thomas Fillebrown, executive committee ; James Truman, Truman W. Brophy, and Francis Peabody, *ad interim* committee.

Dr. Abbott, the newly elected president, was installed, and appointed the following committees :

Committee on Schools—J. A. Follett, F. J. S. Gorgas, Louis Ottofy, C. N. Peirce, and Truman W. Brophy.

Committee on Text-Books—J. D. Patterson, A. O. Hunt, J. B. Willmott, T. E. Weeks, and J. P. Gray.

Adjourned.

NATIONAL SCHOOL OF DENTAL TECHNICS.

ON the last day of the World's Columbian Dental Congress representatives of technic teaching from the following schools met to confer upon the advisability of forming an organization for the advancement of technics and to secure uniformity in its teaching. The following schools were represented : Northwestern University Dental School, D. M. Cattell ; Dental College of the University of California, H. P. Carlton ; College of Dentistry, University of Minnesota, T. E. Weeks ; Dental Department, Vanderbilt University, H. W. Morgan and J. A. Dale ; Louisville College of Dentistry, Francis Peabody ; Western Reserve University, Dental Department, W. H. Whitslar ; Royal College of Dental Surgeons of Ontario, J. B. Willmott ; Ohio College of Dental Surgery, H. A. Smith ; Chicago College of Dental Surgery, T. W. Brophy ; American College of Dental Surgery, Louis Ottofy ; Dental College of the University of Michigan, J. Taft.

Dr. Cattell was elected chairman and Dr. Dale secretary. A resolution was passed restricting the membership to professors of operative and prosthetic dentistry and teachers of dental technics in colleges belonging to the National Association of Dental Faculties.

Drs. Weeks, Carlton, and Dale were appointed a committee on constitution, and the conference adjourned to meet at Old Point Comfort at the time of the meeting of the American Dental Association, to perfect its organization.

Meetings were held at Old Point Comfort pursuant to adjournment, all of the schools concerned in the preliminary meeting being represented except the Dental College of the University of California.

The committee on constitution presented their report, and a constitution was adopted, providing that the name of the association shall be "The National School of Dental Technics." The officers to be a president, vice-president, secretary-treasurer, elected annually, and an executive board of three, the members of the first board chosen to hold office respectively for one, two, and three years, and thereafter one member to be elected annually to serve three years. The duties of the executive board are to pass on all applications for membership, audit all bills, and provide a program for the sessions, which shall consist of reports of the technic work done in various departments. The reports of the proceedings are to be published each year.

The following were elected officers: D. M. Cattell, Chicago, president; T. E. Weeks, Minneapolis, vice-president; J. F. Stephan, Cleveland, secretary-treasurer; T. E. Weeks (three years), chairman; H. W. Morgan, Nashville (two years); George H. Wilson, Cleveland (one year).

Reports were made by Drs. Cattell and Weeks in two courses, covering the technical study of dental anatomy by dissection of teeth and printing silhouette pictures, etc.; and operative technics, covering so much of the knowledge of operative dentistry as students should possess before entering the infirmary. By Dr. Wilson, one course, systematic and practical, of the principles of prosthetic dentistry and crown- and bridge-work; also, a course of laboratory technics reported by Dr. Weeks for Dr. C. M. Bailey, of the University of Minnesota, covering steel technic, vulcanite, metal, and continuous-gum, orthodontia, and crown- and bridge-work. This course is also a sequential, systematic, practical course of the elements of the subjects named.

These reports were listened to with interest by a number of teachers not members, and in the discussion a number of useful suggestions were made.

Adjourned to meet at Asbury Park, August, 1895.

TRI-STATE MEETING—OHIO, INDIANA, MICHIGAN.

SOME months since a movement was set on foot to hold a joint session of the state dental societies of Ohio, Indiana, and Michigan, and representatives were appointed by the three societies to make the necessary arrangements. Pursuant to a call, these representatives met at Old Point Comfort during the sessions of the American Dental Association. It was decided to hold a three-days' meeting at Detroit, beginning the first Tuesday in June, 1895; at which four papers should be presented from each state, and two half-days should be devoted to clinics. An executive committee, consisting of Drs. L. L. Barber, of Toledo, chairman, J. Ward House, of Grand Rapids, and George Edwin Hunt, of Indianapolis, was chosen. Dr. George L. Field, of Detroit, was made chairman of the committee of arrangements, two other members to be selected. Dr. J. Taft, of Cincinnati, is chairman of the three committees as a whole.

NEW JERSEY STATE DENTAL SOCIETY.

At the annual meeting of the New Jersey State Dental Society, held at Asbury Park, July 18, 1894, the following officers were elected for the current year: Dr. C. W. F. Holbrook, Newark, president; Dr. R. M. Sanger, East Orange, vice-president; Dr. Charles A. Meeker, Newark, secretary; Dr. Geo. C. Brown, Elizabeth, treasurer. The Executive Committee is composed of Drs. R. M. Sanger, East Orange; Harvey Iredell, New Brunswick; Oscar Adelberg, Elizabeth; S. C. G. Watkins, Montclair; Wm. L. Fish, Newark. Membership Committee, Drs. Wm. E. Truex, Freehold; F. Edsall Riley, Newark; J. L. Crater, Newark; J. W. Curtis, Hackettstown; Wm. P. Richards, Orange. State Board of Examination and Registration in Dentistry, Drs. F. C. Barlow, Jersey City, president; G. Carleton Brown, Elizabeth, secretary; E. M. Beesley, Belvidere; George Emery Adams, South Orange; Charles A. Meeker, Newark.

Charles A. Meeker, *Secretary*,
29 Fulton st., Newark, N. J.

EDITORIAL.

DISEASES OF THE PERIDENTAL MEMBRANE AND THE GOUTY DIATHESIS.

The *Dental Review* of July contains an article with this title from the able pen of Dr. G. V. Black, giving the results of his observations upon the uric-acid theory recently promulgated by Dr. Peirce, also a record of analyses made by himself of calcic deposits upon teeth, and his conclusions as to the bearing which his investigations have upon the etiology of phagedenic pericementitis. That the paper is one of great interest and importance need hardly be said. The opinion of Dr. Black is sure to command attention whenever expressed, and the article in question is directly in evidence of that fact. The testimony which he offers with respect to the pathological condition under discussion is clear, minute, and, as far as it goes, full. The one feature of the paper which seems to us incongruous is his conclusion of the whole matter, viz:

> "While there is much in the characters, mode of progress, and general surroundings of this disease that naturally give rise to the supposition that it is constitutional in its origin or dependent upon some general dyscrasia, a close review of all the facts known to us give a strong balance in favor of the idea that it is a purely local affection of an infectious character that has relation to a particular tissue, the glands of the peridental membrane. While constitutional treatment has its place in this disease as in other local affections, the dependence must be in local means."

Appended to Dr. Black's paper is a record of analyses of calcic deposits taken from fifty-one patients whose general history and clinical record is given. In all but seven of these cases uric acid was shown by the murexid test to be present in the deposits. With respect to this result of his investigations, Dr. Black says,—

> "The general appearance of uric acid in the calculi of the mouth as shown by these tests, and the close correspondence with the results published by Professor Peirce, startled me. While I had expected, from reasoning on the subject, that slight amounts of uric acid would often be found in such oral calculi as are deposited under conditions of irritation and drooling of serum, I was not prepared for its general appearance in salivary calculus."

He then proceeds to discuss the significance of this general appearance of uric acid in the concretions found in the mouth. He quotes the views of certain physiologists as to the normality of the formation of uric acid in man, showing that there is lack of agreement among them upon this point, some holding that it is not abnormal, while others regard the formation of uric acid as always abnormal and pathological. He then says,—

> "Still, the observations of all go to show its very frequent if not continuous presence in most persons regarded as *fairly healthy* [italics ours]. So long as this is the case, the discussion of these disputed points seems unnecessary to the purposes of this paper. The facts being that uric acid is generally present in the blood, it is not surprising that it appears in slight amounts in the secretions derived from the blood. Some of my tests seemed to confirm the notion that uric acid was at least in greater abundance in serumal calculus than in the salivary. . . . While I have in no case found the expression of uric acid so strongly marked in yellow salivary calculus as in some of the specimens of the serumal, traces occur generally in both, its absence being the exception. It will be noted that while these examples have been taken from all classes of people nearly, as regards the condition of health, I have not happened upon any who were actually afflicted with genuine gout, though a number are from markedly arthritic families. In these the uric acid has always been present, though certainly not in larger quantities than in many who have no gouty kinsfolk.
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> "With this exhibition of the appearance of uric acid in the concretions occurring in the human mouth, the significance of the appearances reported by Professor Peirce is reduced to zero. It is simply a mistake based on the supposition, which seemed reasonable at the time, that ordinarily oral concretions did not contain uric acid. My cases do not show a greater prevalence of uric acid in patients with phagedenic pericementitis than in those without that disease, nor does the amount contained in the calculus seem to be greater so far as that can be judged by the murexid test."

We have searched in vain for evidence which tends to show that Dr. Peirce's theory was based upon the supposition that ordinarily oral concretions did not contain uric acid, and fail to see that such a supposition would in any event affect the significant importance of the observation made by Dr. Peirce and fully corroborated by Dr. Black, that these concretions do contain uric acid. It should be noted in this connection that the murexid reaction is purely a qualitative test for detecting the presence of uric acid, and gives but an imperfect basis for its quantitative estimation. But what is of still greater importance, the absolute quantity of uric acid or urates found in concretions upon tooth-roots cannot in any sense be taken as proportionate to the inflammatory or necrotic process associated with its deposition. The generalization made by Dr. Black that "with this exhibition of the [general] appearance of uric acid in the concretions occurring in the human mouth the significance of the appearances reported by Professor Peirce is reduced to zero" is unwarrantable and fallacious, for the reason that he altogether misapprehends the importance of the quantitative factor in estimating the relationship which the uric acid bears to the pathological process. A strictly analogous generalization would be as follows: Alcoholic liquors are in common and general use in the community, *ergo* alcoholic liquors do not intoxicate and nobody gets drunk.

As Dr. Black correctly states, the significance of uric acid in the blood has been a disputed question among physiologists and pathologists, one group viewing its presence as normal and physiological, another regarding it as an abnormal and pathological condition. Whatever may be the effect of minimum amounts of uric acid, it has been demonstrated conclusively that beyond a certain very definite amount the presence of this substance in the blood is productive of well-known pathological expressions. Haig* places the normal relationship in the production of uric acid and urea respectively as 1 to 33. A production of uric acid beyond this normal quantity, or, what amounts to the same thing, the failure to eliminate the quantity normally formed, results in its retention in the blood or its deposition in the tissues. The determining factors which control the deposition of uric acid and its salts are complex, though certain of them appear to be clearly made out. Haig has shown that the ingestion of any material, whether food-substances or medicines, that will bring about a lessened alkalinity of the blood, causes precipitation of uric acid and urates. Two conditions are described as having their origin in an excess of uric acid in the human system,—viz; gout and lithæmia, or as otherwise termed, uric acidæmia. The clinical distinctions between true gout and lithæmia are made out with reasonable clearness, though the diagnostic symptoms of lithæmia are so protean and varied that much confusion has resulted in the attempts to classify and describe them. This much is made out with certainty, that the pathological manifestations in lithæmia, in whatever form or tissue they may be expressed, are caused by the irritative effects of an excess of the products of imperfect metabolism of proteids, and of these products the group uric acid, xanthin, and hypoxanthin are the most important. The cause of the faulty metabolism is obscure, and so far as the immediate contention is concerned is unimportant. Halliburton* throws much light upon the subject by showing the origin of uric acid from nuclein. The main fact for consideration is that uric acid and its salts are irritant to the tissue in which they are deposited.

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* "Uric Acid in Causation of Disease." Alexander Haig.

Dr. Black, in his study of the subject, fails to see the complete relationship between phagedenic pericementitis and the gouty or arthritic inflammatory process. The term gouty diathesis used by Dr. Peirce in the announcement of his theory was not fortunate, in that gout is but one manifestation of the uric-acid condition ; hence it has led to the mistaken idea that those afflicted with phagedenic pericementitis must, if the theory be correct, suffer also from true gout, or at least arthritic inflammations. Dr. Black seems to so interpret Dr. Peirce's view, and to be influenced by a recognition of this error in forming his estimate of the significance, or as he regards it the insignificance, of the uric acid which he found in his testing of oral concretions. This would seem to be the case also from the fact that he devotes a considerable portion of his paper to a comparison of the clinical expressions of true gout and phagedenic pericementitis, with the result that he makes out a strong case of dissimilarity between the two disorders from that aspect. He does not, in our opinion, give due weight to the differences in anatomical structure and environment of the tissues involved, which should have their full weight in such a study. There is a somewhat different method of arriving at an estimate of the significance of uric acid in its relation to phagedenic pericementitis, which may place its meaning in a different light. The effects of uric acid upon the different tissues of the body have been pretty well studied in lithæmic cases for the past twenty-five years or even longer, for Da Costa† quotes Sydenham as writing upon the subject, so that Dr. Black's statement that it is a recent fad of medical writers needs qualification.

It is well known that because of the comparative insolubility of uric acid, and especially of some of its salts, it is incapable of diffusion through membranes, hence it remains deposited in the tissues, acting as an irritant. The effects of this irritative action are different, according, among other factors, to the kind of tissue in which it is manifested ; thus it may produce a hyperplastic condition, cystic degeneration, or molecular necrosis, etc., according to circumstances.

We called attention‡ to the possible common constitutional origin of phagedenic pericementitis and the abnormal condition of the labial mucous glands which produces dental erosion. The analogy has received further support from the results obtained in a case subjected to constitutional treatment for the cure of lithæmia which was coincident with dental erosion. This patient had not the slightest trace of arthritic manifestations, but the erosion of her teeth was extremely rapid, very large areas of lost tooth-structure involving the six superior front teeth having occurred within a period of less than six months. The gums were turgid with blood, the labial mucus strongly acid, and a slight pyorrheic condition involved the inferior central incisors. She was referred to a medical expert for an opinion as to her systemic condition, upon which point the report was made that the patient was a typical case of uric-acid diathesis. At this time it was noted that the patient was afflicted with a goitre of the hyperplastic type, which had developed three years previously during a visit to Switzerland. In view of the uric-acid condition the patient was put upon lithium bitartrate,* and a modified and restricted diet. After three weeks of this regimen the thyroid gland had become reduced in size to nearly normal, and the oral conditions were practically well ; in a fortnight later the goitre was not recognizable. There was also entire disappearance of the other systemic manifestations of the lithæmia, including the acidity of the labial mucous secretion. The patient is still under modified constitutional treatment.

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* "Physiology of the Cell." *Lancet*, March 18, 1893.

† *University Medical Magazine*, May, 1894.

‡ "Oral Manifestations of Lithæmia." DENTAL COSMOS, June, 1894, page 481.

In this case we have strong presumptive evidence of the irritative action of uric acid upon the glandular tissue involving the thyroid and the labial mucous glands, in the first instance producing a hyperplasia, and in the second complete alteration of function which inverted the reaction of the secretion. Dr. Black has described,† as one of the anatomical features of the peridental membrane, certain glands which he states are true epithelial tubular glands, that pour their secretion into the gingival space, and makes the following significant assertion concerning them‡ : "The secretion from these glands is also the source of the serumal calculus deposited around the necks of the teeth within the gingival space. This is augmented greatly by irritations that increase the flow, or by serum exuding as a result of irritation." We have, then, in the three instances cited, examples of the results of irritative action in epithelial glandular structures, the modifying factors being the anatomical and functional differences of the thyroid gland, the labial mucous glands, and the tubular epithelial glands of the peridental membrane respectively. Each of these local expressions of a constitutional vice has been found in connection with excessive amount of uric acid in the blood, or lithæmia. Specific treatment addressed to the removal of the products of faulty metabolism has cured the local conditions. In view of these facts, the *onus probandi* is not upon those who hold to the uric-acid origin of phagedenic pericementitis, but upon the defenders of the purely local origin of the disease.

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* "Dental Manifestations of Gout and Lithium Bitartrate." Edward C. Kirk. *Lancet*, June 30, 1894.

† "The Periosteum and Peridental Membrane," by G. V. Black. W. T. Keener, Chicago.

‡ *Dental Review*, July 15, 1894, page 463.

Dr. Black rejects the gouty origin of phagedenic pericementitis mainly because the latter is lacking in the paroxysmal feature of the former, and possesses the distinctively suppurative character which is lacking in gouty inflammations.

We are not by any means sure that the paroxysmal element is lacking in cases of phagedenic pericementitis. A closer study may show it to be a pretty general concomitant, as it has certainly been found in a number.

As to the suppurative factor, is there any reason, when an irritative action has resulted in molecular death of the tissue involved, that it should not be the seat of suppuration? Is not that one of the methods of termination of tissue-necrosis, and does phagedenic pericementitis mean anything else than tissue-necrosis?

THE NATIONAL SCHOOL OF DENTAL TECHNICS.

No more important problem confronts dental teachers than that of developing in pupils the degree of manual dexterity necessary to make the aspirants for dental honors useful members of the community as soon as they are graduated. As the practice of dentistry is a means to an end, and that end largely the restoration of substance lost through disease-process, the ability to make the restoration as nearly perfect as possible is the desideratum. While all the mechanical operations involved are governed by certain underlying scientific principles, their performance belongs to the technical side of dentistry.

The importance of this aspect of dental practice cannot be overestimated. Although it is not all in all, it is a matter of general agreement that a practitioner's value in a community is usually in the direct ratio of the amount of manipulative ability he possesses. To be a good dentist he may or may not be a good scientist, but it is absolutely essential that he be an artisan of the first order.

It is rarely we find a student, on his entrance to dental studies, possessed of any great ability as a mechanician. But few have had any tuition along the lines of the manual-training idea, few have been laboratory students; but fresh from school or other employment, they enter the portals of the professional gateway of dentistry, freshmen indeed! In three years to learn as much or more of science than was taught in medical colleges twenty years ago, and to acquire a degree and type of manual dexterity higher than is required in most handicrafts,—the task is no light one, nor should it be. It is a prime requisite that the student do acquire this latter; that he learn not only "why to do," but "how to do."

What avails it if a student knows what should be done, if he learns not how to do it? That he is able to answer any question upon the subjects he has been taught, and yet is unable to put his knowledge to effective use? He may name every micro-organism known to mycology; and yet if he is unable to treat disease-conditions, of what service is he as a practitioner?

Experience shows that no man has full comprehension of a subject until he has passed over and known all the steps which lead to our present knowledge of it; and so he does not know anatomy, physiology, chemistry, pathology, operative and prosthetic dentistry, until he has laid out with his own hands the facts and conditions upon which teachers base their teachings. For practical, useful, or applicable knowledge is a comprehension of things as well as names; the names may not be known, but the things themselves must. This is essential in dentistry, where education is a matter belonging as much or more to the functions of the fingers as to the function of word-memory.

To be what it should be, dental education must inculcate an absolute correspondence between thought and act. Whatever the highest centers of the nervous system command, the fingers should be ready and able to execute. A co-ordination of the most refined type—both ends of the machine trained to the utmost nicety—is required.

The "rule-of-thumb" laboratory teaching of forty years ago produced men whose manipulative dexterity would have been phenomenal if it had not been common; whose practical knowledge of "things"—of the "how" without regard to the "why"—made them resourceful whatever difficulties confronted them. To-day we have in its stead "technic teaching," which should produce a higher type of men, inasmuch as it enforces the "why" with the "how." Technic teaching, for which the dental world is indebted to Dr. G. V. Black as its originator, develops manipulative ability equally with the old method, but with this difference: that the modern method is based on scientific principles and proceeds on scientific lines, so that theory and practice go hand in hand, which of itself constitutes science.

It has been written again and again, "the scientific, properly viewed, is the practical." Dental technics is a scientific adaptation of laboratory teaching. The knowledge which it imparts is a necessity to the practical pursuit of dentistry; it lies in fact at the very foundation of practice, and its teaching is properly placed at the threshold of the dentist's studies. One who has passed through technic courses will not have to bewail the necessity of acquiring undergraduate experience at a time when his working hours will be fully occupied with post-graduate studies and responsibilities.

It is therefore peculiarly gratifying to note that the subject is coming more sharply to the front, as evidenced by the recent formation of an association of the teachers of technics in the dental colleges. On another page we present a brief sketch of the proceedings leading to the organization of the National School of Dental Technics, and a *résumé* of the first meeting of the organized body. This association is distinctly not legislative in its functions, all its "business" being transacted by an executive board. The entire time of the sessions, which will be held annually, will therefore be devoted to the hearing and discussion of technic work. Hence the name "school" rather than "association." The reports, which are to be published annually, ought to be a valuable addition to the literature of the profession, as covering completely the ground of technic teaching as practiced in the dental colleges of this country.

That a lively interest has been awakened in the subject is evidenced by the fact that the National Association of Dental Faculties at its late meeting indorsed a text-book on the subject of "Operative Technics," by Professor Weeks, which is now in course of publication.

ADDED PAGES.

THE pressure on our space has compelled the addition of eight pages to the present number. For the same reason several matters of professional interest are necessarily laid over.

The printing of the report of the annual meeting of the National Association of Dental Examiners is unavoidably postponed, owing to a misunderstanding between the secretary and the reporter. It will appear in the October issue.

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OBITUARY.

DR. R. B. WINDER.

DIED, at Baltimore, Md., July 18, 1894, of heart-disease, RICHARD BAYLY WINDER, D.D.S., in the sixty-seventh year of his age.

Dr. Winder was born at Drummondtown, Accomac county, Va., July 17, 1828. He studied dentistry with Drs. F. J. S. Gorgas and T. S. Waters, of Baltimore, and entered upon dental practice in that city in 1869. He was graduated at the Baltimore College of Dental Surgery, class of 1869, and had been dean of that institution for many years up to the time of his decease.

He was a member of the American and Southern Dental Associations, and also of many local societies. To Dr. Winder was largely due the credit of having dentistry assigned to the list of professions by the Census Bureau.

Dr. Winder was twice married—first to Miss Custis, and secondly to Miss Kate Dorsey, who survives him with two children, Dr. R. Bayly Winder, Jr., of Baltimore, and Mrs. H. A. Miller, of Wilmington, Del.

The New Jersey State Dental Society, of which Dr. Winder was an honorary member, in session at Asbury Park, July 19, passed the following resolutions of respect to his memory:

WHEREAS, In the death of our esteemed honorary member, Richard B. Winder, M.D., D.D.S., dean of the Baltimore College of Dental Surgery, the dental profession and this association have lost one of their most worthy and honored members. He was foremost with those who labored to advance the dental profession by filling its ranks with honorable and educated dentists. He was a devoted professional brother, kind and charitable to an eminent degree, and filled with true southern hospitality wherever met; therefore, be it

Resolved, That we bow to the inevitable, yet desire to emphasize our grief at his death, and to bear testimony to his many abilities and his self-sacrificing spirit in his intercourse with his fellow-men.

Resolved, That a copy of these resolutions be spread on the minutes, and the same be sent to the dental journals for publication.

F. C. BARLOW,
S. C. G. WATKINS, *Committee.*
R. M. SANGER,

DR. AARON COLTON.

DIED, at Great Barrington, Mass., July 14, 1894, of apoplexy, AARON COLTON, M.D.S., of Hudson, N. Y., in the seventy-seventh year of his age.

Dr. Colton's death was unexpected, as he was in his usual good health up to the date above given, when he left Hudson in the morning to spend Sunday with friends at Great Barrington, but was taken suddenly ill after reaching there, and died toward evening of the same day.

Dr. Colton was born at Conway, Mass., April 14, 1818. He commenced the study of dentistry in 1842, and subsequently entered into dental practice at Great Barrington, but had been a prominent dentist of Hudson, N. Y., for a great many years, up to the time of his decease. He was a charter member of the Dental Society of the State of New York in 1868. He passed the examination of the Board of Censors, and received their degree of M.D.S. He was also a member of the American Dental Association, and of the International Medical Congress held at Washington in 1887. In 1892, having been in continual practice for fifty years, the Third District Dental Society of the State of New York honored the event by making him a senior member, it being the first instance of any member of the society having practiced that length of time.

In 1844, Dr. Colton was married to Henrietta Lyman, of East Hampton, Mass. After her decease he married, secondly, in 1869, Mrs. Emma P. Bodentha, of Hudson, N. Y., who survives him. Two children also survive him,—Mr. E. W. Colton, of Boston, Mass., and Mrs. George Hardie, of Pittsfield, Mass.

DR. JOHN S. MOORE.

DIED, in Napa, Cal., July 28, 1894, of paralysis, JOHN S. MOORE, D.D.S., in the sixty-third year of his age.

Dr. Moore was born in Guilford county, N. C., June 1, 1832. He was educated at Shady Grove Academy, in Rockingham county, after which he taught school for several years in North Carolina, Virginia, and Texas. In

1855 he decided to adopt dentistry as a profession, and studied with Dr. Duke Hay, in Rockingham county, subsequently graduating at the Baltimore College of Dental Surgery, class of 1860. He practiced in Madison, N. C., until the spring of 1866, when he moved west and located at Pleasant Hill, Mo. While in Missouri his was the test case against the Goodyear Dental Vulcanite Company. In 1876 he went to Contra Costa county, California, locating at Danville, and finally at Martinez, where he was in practice up to the time of his disability from paralysis in 1891. He had built up a fine practice in Martinez, being a skillful dentist and courteous gentleman ; but never sufficiently recovered to resume his profession.

Dr. Moore was married in 1855, while in North Carolina, to Emma R. Martin, and his widow and three children survive him,—Dr. W. A. Moore, of Benicia, Dr. J. S. Moore, Jr., of Martinez, and Mrs. J H. Borland, of San Francisco. He was an Episcopalian, and took much interest in the welfare of that church. His remains were interred in Alhambra cemetery.

DR. J. W. RHONE.

DIED, at Bellefonte, Pa., May 15, 1894, of heart-disease, Dr. J. W. RHONE, in the sixty-second year of his age.

Dr. Rhone was born in Potter township, Center county, Pa., January 20, 1833. He was educated at Pennsylvania College, Gettysburg. After some years spent in the management of his ancestral farm and in mercantile ventures, in 1862 he began the study of dentistry with Dr. John D. Wingate, at Bellefonte. In 1863 he matriculated at the Pennsylvania College of Dental Surgery, but did not take the full courses, and consequently did not graduate. In 1864 he entered practice at Boalsburg, and in 1874 removed to Bellefonte, where he continued in practice up to the time of his decease, notwithstanding a broken hip from a fall on the ice in 1891, which necessitated his ever afterward using crutches in walking.

In 1859 Dr. Rhone was married to Miss Caroline E. Keller. He had two children, one daughter and one son, Dr. Charles E. Rhone, of Bellefonte.

DR. JOHN W. WADE.

DIED, at Rio de Janeiro, Brazil, June 4, 1894, of yellow fever, JOHN WILLIS WADE, D.D.S., in the twenty-fifth year of his age.

Dr. Wade was born at Owego, Tioga county, N. Y., March 15, 1870. He studied dentistry with Dr. Downs, of Owego, and subsequently went to Atlanta, Ga., and entered the dental department of the Southern Medical College, from which he graduated with the class of 1891. In the same year he went to Brazil, where he was in practice for some time at São Paulo, and subsequently at Rio de Janeiro, where he died as above stated. He was a young man of promise, and his death is much regretted.

PERISCOPE.

DENTAL REQUIREMENTS.—The Education Committee of the Medical Council have had under consideration for some time the refusal of the Royal College of Surgeons in Ireland to insist that candidates for the dental license should produce evidence that they have received instruction in mechanical dentistry during three years from a registered dental practitioner. The committee have come to the conclusion that the course of study prescribed by the college is not such as to secure the possession by persons obtaining its license of the requisite knowledge and skill for the efficient practice of dentistry; and they have recommended the Council to represent this opinion to the Privy Council, and to request the Privy Council to make order that the certificates granted under their present regulations by the Royal College of Surgeons in Ireland shall not confer the right to be registered under the Dentists Act. The Medical Council have adopted the committee's recommendations, but it was stated in the course of discussion that the college is to give way, and thus avert disaster.

The council at the same meeting repeated its warning to dentists that the issue of advertisements containing claims of superiority over other dentists, or unfair depreciation of them, "may easily be carried so far as to constitute infamous or disgraceful conduct in a professional respect."—*Chemist and Druggist.*

BELLADONNA IN SOME BUCCAL AFFECTIONS.—Dr. Koebner (*La Semaine Médicale*, No. 66, 1893) finds in certain affections of the mouth, as leucoplasia, mercurial stomatitis, syphilitic plaques, and ulcerations, that the effect of cauterization to combat the buccal lesions is often rendered vain by the excessive secretion of saliva, which washes away the eschar resulting from the action of the caustic. In order to diminish the salivary secretion in such cases he has had recourse to belladonna, in the following formula:

Extract of belladonna, cgm. 30 (gr. v);
Cherry laurel water, gm. 5 (ʒjss);
Distilled water, gm. 10 (ʒijss).

Ten to twenty drops two or three times a day.

If this should be found not active enough on account of a poor preparation, then employ atropin in half-milligram ($\frac{1}{120}$ gr.) pills. One-half hour before cauterization of the diseased tissue he administers twenty drops of this solution, repeating it at the end of two to three hours. If necessary, ten to fifteen drops may be given the next morning. In patients who secrete saliva profusely and who are obliged to speak a great deal during the day, he cauterizes after the evening meal, administering thirty drops before and twenty after the operation. The following morning the patient should take twenty drops of the solution. Often it will be convenient or necessary to have the patient take from ten or fifteen to twenty drops per diem, for some time. In case that there be a paralysis of accommodation,—*i.e.*, the patient finds it difficult to read small type,—it is advisable to interrupt treatment for one or two days. With the aid of belladonna, patients who are afflicted with syphilitic ulcerations or plaques of the mouth or mercurial stomatitis cease to secrete saliva or experience pain on swallowing or mastication. In such cases, as well as in those affected with buccal leucoplasia, cauterization of the lesions at long intervals soon brings about healing.—*Cincinnati Lancet-Clinic.*

COPYRIGHTS AND PATENTS.—Dr. Leartus Connor, of Detroit, Michigan, states his views respecting the ethical question involved in the patenting of surgical instruments in a communication to the editor of the *Journal of the American Medical Association*, June 2, 1894, as follows:

"In the *Medical News* for May 19, our esteemed friend, Dr. Gould, states his view of the difference between the copyrighting of medical books and the patenting of mechanical appliances. Thus he says, 'one is payment for instruction, while the other is tribute for permission to use a certain instrument.'

"The fallacy of this statement is evident. Granted that the book instructs, does not the instrument also instruct? The buyer of the book pays for the brain-work of the author, and in like manner the buyer of the mechanical appliance pays for the brain-work of the inventor. If both are good articles they will both instruct the profession who use them. Both are teachers. Most medical books introduce into their pages the work of inventors of mechanical appliances, and even introduce cuts of the same. It is said that the book copyright does not set up a monopoly. It is well that this is not believed, else some person would have to pay damages for publishing books without the permission of the person who copyrighted the same. Every physician knows that a medical book is a monopoly to the full extent of the protecting law under which it is issued.

"We are surprised that the claim is made that the patenting of an instrument prevents the buyer from being instructed by the same. Every person knows that the sale of such mechanical appliances depends upon the instruction of the profession respecting their uses. Every mechanical appliance of merit is a great educator to the entire profession, even in lines outside of its especial adaptation. It seems perfectly evident that both good books and good mechanical appliances alike teach the medical profession new ideas or old ones in new applications. Bad books and bad instruments also teach by their negative qualities. We are of the belief that the giving of both author and inventor the right to avail themselves of their rights as citizens, in the matter of copyrighting and patenting the products of their brain activities, would promote equity between physicians and advance the general prosperity of the entire profession.

"We have searched in vain in all directions for reasons for denying the inventor of mechanical appliances what is granted the medical book writer. We can find absolutely none. It were tardy justice to grant the former his legal rights at this late day, but tardy justice were better than continued injustice."

ANTISEPSIS OF THE MOUTH.—For stomatitis, as in typhoid fever:

℞—Boric acid, 1 gramme (15½ grains);
Chlorate of potassium, 07.5 gramme (12 grains);
Lemon-juice, 15 grammes (3¾ drachms);
Glycerin, 10 grammes (2½ drachms).

Also:

℞—Thymic acid, 0.10 gramme (1¾ grains);
Benzoic acid, 1 gramme (15½ grains);
Tincture of eucalyptus, 10 grammes (2½ fluidrachms);
Water, 1000 grammes (1 quart).

As a gargle or spray in tonsillitis and acute angina:

Coca-leaves, 10 to 20 grammes (2½ to 5 drachms), infused in boiling water, 1000 grammes (2 quarts); add borate of sodium, 30 to 40 grammes (1 to 1¼ ounces), or salicylate of soda, 10 to 20 grammes (2½ to 5 drachms); or carbolic acid, 5 to 10 grammes (1¼ to 2½ drachms). (Le Gendre and Broca, *Traité de thérapeutique infantile médico-chirurgicale.* Paris, Chez Steinheil.) —*Universal Med. Journal.*

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A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a Thesis.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING JULY, 1894.

July 3.—No. 522,188, to George K. Bagby. Dental articulator.
" " No. 522,192, to A. W. Browne. Head-rest.
" " No. 522,211, to W. S. How. Dental abrading or cutting tool.
" " No. 522,212, to W. S. How. Dental bite-plate.
" " No. 522,291, to C. H. Davis. Angle attachment for dental engines.
" " No. 522,309, to W. Wright. Dental apparatus.
" " No. 522,400, to E. Bolus. Artificial tooth.
" " No. 522,552, to A. W. Browne. Adjustable bracket for dental engines.
July 10.—No. 522,842, to A. R. Lawshe. Saliva pump.
" " No. 522,922, to D. Stuck. Dental chair.
July 17.—No. 523,058, to Willy Wallach. Brush.
" " No. 523,159, to Jules Bengue. Receptacle for ethyl chlorid, etc.
" " No. 523,192, to Edw. H. Angle. Tooth regulator.
July 24.—No. 523,444, to Charles H. Richardson. Controlling mechanism for electric motors.
" " No. 523,472, to J. G. Hollingsworth. Method of forming tooth-crowns.

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ORIGINAL COMMUNICATIONS.

CLEFT PALATE.

BY NORMAN W. KINGSLEY, M.D.S., D.D.S., NEW YORK, N. Y.

(Read before the Connecticut Valley Dental Association.)

A PAPER is not worth the mental effort of preparation, nor is an author justified in taking up the time of an intelligent audience with it, unless it contains something new, or at least new to the audience addressed. If I am to follow strictly the line which I have thus prescribed, I shall have the merit at least of not wearying my hearers.

When I first became interested in this class of deformities, the literature upon the subject was extremely limited; the first edition of "Harris's Principles and Practice" was the only work I had access to. I was wishing for an opportunity when I was suddenly confronted with one of the worst cases which I have ever seen. It was a double cleft of the palate, alveolus and hare-lip. An operation had been performed upon the lip during infancy, and in so doing the surgeon had removed the pendent intermaxillary bone, thus sacrificing all possibility of the eruption of any incisor teeth. With the meager knowledge obtained from "Harris" I made for this patient an obturator of vulcanite, filling the gap in the alveolus with a carved porcelain block.

In that same edition of "Harris" I read of a "Mr. Stearn, surgeon, of London," of whom it was said that he had made a very clever contrivance which had proved beneficial, but the description was so incomprehensible to me that I was none the wiser. My patient, described above, was a young lady from the southwest, about twenty-one years of age. After the completion of my obturator, which was to all intents and purposes identical with many that I have seen in later times, and for which a claim of originality has been made, I learned by the merest accident that there was a gentleman living in New York who had made for himself an artificial palate of rubber.

I hunted up this gentleman, and to my surprise found that he was *the* Mr. Stearn, surgeon, of London, mentioned by "Harris." I told the father of my patient that I believed that a palate such as

Dr. Stearn (for he was a graduate of medicine) had made for himself would benefit his daughter more than the obturator which I had made. The father then arranged with Dr. Stearn to make for his daughter an artificial velum in conjunction with my prosthesis, as before described.

This was my introduction to artificial vela, and was in the winter of 1859 and 1860.

Dr. Stearn's velum was constructed by his taking small impressions of the various parts of the cleft, in white wax, upon the end of a stick, and then combining those forms and making a copy by carving in wood. He was thus able to produce, and did produce, a mold made of wood, in which he subsequently vulcanized his artificial velum.

From that moment I conceived the idea of making for the same patient an artificial velum which I believed could be produced with less labor and would be more exact in its adaptation. I began as a dentist would naturally begin. I took an impression with plaster, and was quite sure that I had a cast of all the parts in their normal relations and in their entirety before I took my next step. I made a model of my velum with sheet gutta-percha, and my mold in which to vulcanize was made of type-metal.

This, my first artificial velum, was modeled upon the lines of Dr. Stearn's. It was not a *copy* of Stearn's, but was an imitation. His required a delicate gold spring to make it effective; subsequently I discarded the gold spring, and varied the form so that it was unnecessary. Nevertheless, I did not venture very far away from so high an authority as I then conceived Dr. Stearn to be. The outcome of this case was that the patient, after trying both instruments, wore mine in preference to Dr. Stearn's, because she said it was more comfortable. A description of Dr. Stearn's velum has gone into our literature; nevertheless, I desire to call attention to the feature which he seemed to pride himself most upon. In a communication which he made about that time to a dental journal called *The Vulcanite*, after describing the triple laminæ which made his instrument collapsible, he says, "I wish to be understood as saying, in exact terms, that I consider the slit and opening through the center, and its closure by a sort of valve on the anterior surface, as an essential feature of all artificial vela; and also that I do not acknowledge the remotest obligation to any other person for this one idea, which did not present itself to my mind until I had occupied myself with my first case (in 1841 and 1842) for more than a year. . . . Eighteen years have since elapsed, and I have not yet conceived any other possible way of constructing an instrument at once simple, delicate, and durable, but in this *triple* form; and, though I trust and believe that others will hereafter improve upon my methods, I am confident that this one feature will be preserved in all successful 'obturators.'"

Figs. 1 and 2 represent respectively the oral and nasal aspects of Dr. Stearn's artificial velum, as published by himself in 1860 in *The Vulcanite.*

For the first four years of my experience in making artificial vela, I confess that I was handicapped by the foregoing authoritative statement. I did not dare to depart radically from that peculiar character. In the autumn of 1863 I was present at a meeting of the Odontographic Society of Philadelphia, and exhibited examples of the artificial vela which I was then making. To those who were familiar with the Stearn instrument the similarity was plain to be seen.

In December, 1864, I was in London, and the criticism of London dentists upon the complex character of the instrument aroused me to the necessity for a more simple contrivance; and I then produced my first really original appliance. It had not then, nor has it had since, any of the characteristics of Stearn's instrument, of which he was so proud. Fig. 3 shows my artificial velum as contrived in London, 1864.

FIG. 1.

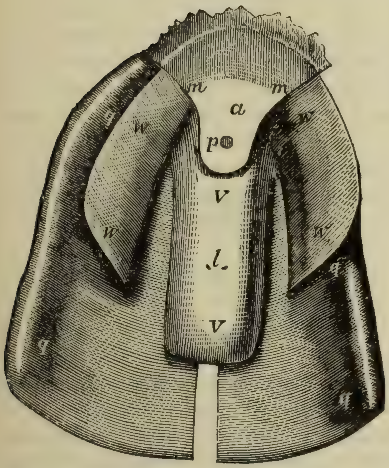
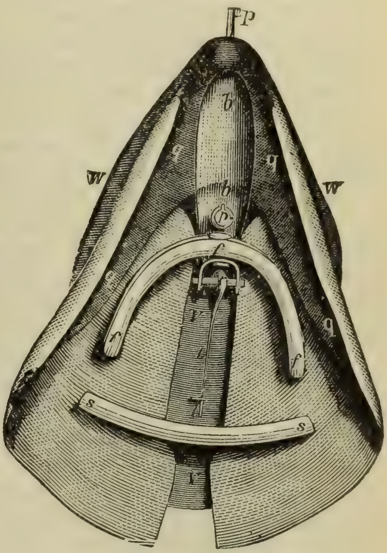
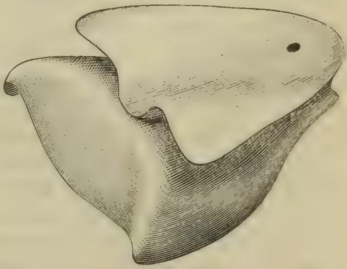


FIG. 2.



Mine was an original conception, and was no more like the Stearn instrument than is the modern repeating rifle like the old flint-lock shot-gun,—the only points in common being that both are made of the same material. I have been informed that Dr. Stearn before his death abandoned his complex instrument, and was wearing one made upon the same plan as my own; thus was the compliment returned.

FIG. 3.



I must apologize for so much of personal history. I would not have intruded it, nor would I have regarded it of sufficient interest to take up the time of an association, were it not that, in the discussions upon this subject before the New Jersey State Dental Association in the summer of 1893, Dr. Truman, of Philadelphia, is reported as saying, "I think it would be well to have the matter settled some time, as a matter of history. . . . It is of course unprofitable to discuss a matter of this kind when we have no data at hand, but I think the matter ought to be settled."

It is somewhat mortifying to me that neither so learned a man as Dr. Truman nor any one else in that audience was aware that a faithful and correct history of all that I have above stated is to be found in my work on "Oral Deformities," published more than a dozen years ago.

It is unnecessary to repeat that the only object of any interference is to give to the sufferer the power of articulate speech ; and perfect articulate speech can only be produced normally by voluntarily opening and closing the passage from the larynx to the nose. If this cannot be accomplished because of the inability of the palate to act, speech will be defective.

This axiom has been so often promulgated, and is so eminently true, that it is surprising that it is so constantly ignored by surgeons, who can recognize no other treatment for these cases than the knife.

Surgeons are found who still continue to sew up cleft palates in spite of the almost universal failure as a beneficent operation, in spite of the fact that the operation has been abandoned by the most conservative surgeons, and in spite of the repeated proofs that in the large majority of cases a scientifically applied apparatus will confer a benefit.

The surgeon sews on, seemingly unmindful of everything but loyalty to his profession, whose dignity will not admit a failure as possible. I am reminded of an interview with Sir Wm. Fergusson in 1865. He had invited me to bring to him a lad about nine years old for whom I had made an artificial palate. The case was one of a most hopeless character for an operation ; nevertheless, after viewing my work the great surgeon looked down from his toplofty altitude, and patting the boy on the shoulder, said, "Well, my little man, if you don't want to wear that, come to me and I'll sew you up."

I suppose there have been cases of surgical operations which have enabled the beneficiary to speak perfectly. I repeat that I *suppose* so, but in all of my nearly forty years of experience I have never met one. They are claimed in the books and when the patient is out of sight, but I am skeptical about there being such a percentage as to justify surgical interference in any but rare cases, while it must be an extraordinary case to which an apparatus could not be applied with expectation of good results.

I have never seen the assumption of superiority manifested more forcibly than in a work that, so far as I know, embodies the most recent views of English surgeons. The author is William Rose, F.R C.S., Professor of Surgery in King's College, London. In the chapter "On Obturators and Artificial Vela," he says, "Such are the Utopian definitions given by American dentists." The definitions which he calls Utopian are taken from the "American System of Dentistry," and are as follows :

"An *obturator* is a stopper, plug, or cover, stationary and fitting to an opening, with a well-defined border or outline, and closing the passage.

"An *artificial velum* is an elastic, movable valve, under the control of surrounding or adjacent muscles, closing or opening the posterior nares at will, and applicable to cases of congenital cleft, occasionally when the soft palate has been destroyed by ulceration, but never merely to perforations of the hard or soft palate."

These are what he calls "Utopian definitions,"—that is, imaginary, fanciful, chimerical. I doubt if it is possible to define the terms "obturator" and "artificial vela" in more concise and specific language. The definition becomes a complete description of the instrument. In his chapter upon that subject he makes the following argument for surgery and against the use of such appliances: "The mental effect on patients operated on is much more satisfactory than that following the application of artificial assistance; whilst the presence of a foreign body in the mouth is a source of continual danger and irritation, for there is always the possibility of the obturator slipping out of position and becoming impacted in the pharynx and œsophagus. Irritation of the sides of the cleft not uncommonly results from their use, and may end in ulceration and even necrosis. When obturators and vela are removed from the mouth, a spongy, granulating surface is often seen, bleeding on the slightest touch, and giving rise to a peculiar fœtor of the breath."

This arraignment is more than Utopian; it is whimsical and fantastic. But I will not deny that it may be true of the appliances with which he is familiar; it would be a libel if said of that branch of prosthetic art in America. With properly constructed apparatus the criticism which he makes can only apply to persons of slovenly habits. Objections couched in the same language can be used with equal force against thousands of sets of artificial teeth worn by careless people; but no one has the temerity to say that artificial teeth ought not to be worn, or that they are not a great blessing.

He further says, "These appliances cannot be fitted to a patient much before the age of fifteen, and the habit of defective articulation has been fully formed by that time." And this is said in the face of the fact that I had made and introduced an artificial velum for a child of nine years, in London, nearly thirty years ago, and have been doing it repeatedly for children under ten years of age ever since.

But English surgeons are not the only ones who are claiming a greater superiority for surgical treatment than the facts at present seem to warrant. Just now two dentists have stepped into the arena and ask attention. Perhaps if they were surgeons by profession, rather than dentists, they might be lost among all the others of their class; but being dentists, ambitious to shine in a broader field, their efforts obtain a hearing—among dentists. It is a laudable ambition to be something more than a dentist, particularly in a kindred calling.

I very much doubt the wisdom of the average dentist's attempting anything professional except dentistry, but skill in dentistry is certainly an excellent foundation upon which to build a surgeon. In Philadelphia we have one brilliant example, at least.

Dr. John S. Marshall, of Chicago, read a paper upon "Congenital Fissures," etc., recently before the Tennessee Dental Association. I have read this essay with some care, and take pleasure in recording that it is one of the most conservative articles from the operating surgeon's standpoint that I am familiar with. He makes no pretence of claiming that surgery is the best treatment for more than a limited number of cases, and of those cases he says, "The main object is to restore function, and this can only be accomplished by restoring the velum and uvula to their proper width and length, so as to insure a perfect occlusion of the naso-pharyngeal opening."

That sentence is worthy of being framed in gold and conspicuously hung in every surgery. He furthermore says, "In clefts of the velum palati where the fissure is very wide and the deficiency in tissue is considerable, it is better to depend upon the artificial velum rather than to attempt a cure by surgical means, for unless the velum can be restored to its normal length, the operation would be a failure, for restoration of function is the main object in view."

It is with pleasure that I read of the importance that Dr. Marshall gives to the *length* of the surgical velum. I have never seen that idea more forcibly presented, and yet I have been trying to have it recognized for a professional lifetime; and while it may have been admitted theoretically by surgeons, it has been ignored in practice.

I wish I could indorse Dr. Marshall's colleague in Chicago, Dr. Brophy, as warmly. Dr. Brophy has evidently been ambitious to do something startling, and he has succeeded. He ought to feel gratified, as he has attained an eminence denied to most,—viz, performing an operation and having it called by his name; *that is fame.* He has that satisfaction whether the operation proves a blessing or a curse. It will take several years before we can render a verdict. At the present outlook, as one of the jurors, I am not sanguine of its ultimate benefit. Dr. Brophy does not wait for the age of consent, nor for the age of co-operation, but operates in the earliest weeks of infancy, and does not hesitate apparently to undertake most unpromising cases. The reason I say unpromising is because his own description of his methods can only apply to cases which in the light of restoring function cannot be other than hopeless.

He operates at an age when the bones are so soft that they can be cut with a knife, and he trims the edges of the fissure, bones and all, "thoroughly and with a bold hand." The fissure is brought together by wire sutures passing through a lead button and through the body of the maxilla above the palatal bone, then tightened by twisting until the parts are in contact.

"If the resistance is such that the edges do not readily approximate, the malar process is divided on either side by the aid of a heavy scalpel." The principle involved here, of bringing the divided portions of the maxilla into contact under pressure, is not original with Dr. Brophy. It was on record more than forty years ago, and has been performed occasionally by surgeons since; but there do not appear to have been such results as to justify any general adoption. It is perhaps the temerity with which he divides the maxillary bones that attracts attention, and his method of passing the wires through those bones that makes it unique. As open nasal passages are essential to the purity of the voice and speech, we should like to know what becomes of these passages when the two halves of the superior maxilla are jammed together?

Dr. Brophy says, "When the child comes to an age that he may articulate, his articulation is correct, and he lives and moves and has his existence without being embarrassed through life with the deformity which characterizes cleft palate." I hope that his sanguine expectations of perfect articulate speech in those cases will be realized; but if they are, it will violate all my observations. It may be that through the medium of his cases we shall make new discoveries in the mystery of articulate speech. It has been commonly held that clearness and distinctness of enunciation are largely dependent, other things being equal, upon a broad and well-formed jaw, and that a narrowed, ill-formed jaw and irregular dental arch are hindrances to vocal culture. But it may be that we shall now learn that these theories are erroneous.

I have seen too many cases of defective speech after excellent operations on the soft palate, when the jaws and teeth were well formed, and I have also seen too many cases of indistinct utterance arising from ill-shapen jaws and irregular teeth where the palate was normal, to believe that Dr. Brophy's sanguine expectations, as quoted above, can be realized in cases where hard and soft palate and jaw-bones are operated upon as described by him. When asked what the effect would be upon the germs of the undeveloped teeth, he was wise to answer that he "did not know." But opinions will differ when he says, "It makes very little difference even though the germs of several teeth are destroyed." Again he says, "If, however, the upper superior [*sic?*] arch should be abnormally contracted, and when teeth erupt fail properly to antagonize with their fellows of the lower jaw, the means well known to the modern dentist may be employed, by which the arch can be expanded and the slight abnormality removed."

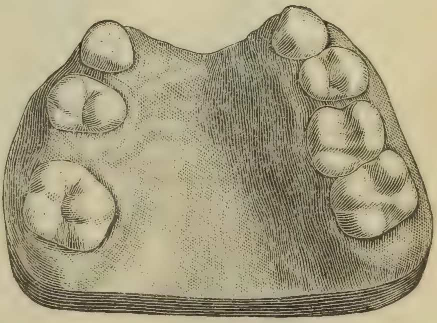
The possible condition thus admitted by Dr. Brophy is too serious a matter to pass lightly.

I have had too many years' experience in cases of cleft palate and cases of dental irregularities not to view such possibilities with some alarm. I know it is idle to speculate, but I cannot avoid the conviction that he is laying the foundation for serious trouble in the future.

In the discussion of Dr. Marshall's paper before alluded to, Dr. J. J. R. Patrick said, "We may have cleft palate without hare-lip, but never hare-lip without cleft palate."*

A hare-lip without a cleft palate is not such an uncommon occurrence but that it has been observed by many and has been recorded several times. In this connection I may add that Mr. Rose, the English surgeon from whom I have made extracts, says, "In all cases of *double alveolar cleft* the palate is also involved." This is also an error, as I have but recently had under my care a child of nine years of age who was born with a double hare-lip and *double alveolar* cleft, but without any defect of either hard or soft palate. The speech of this child is clear and distinct. Fig. 4 shows the plaster cast of such a case.

FIG. 4.



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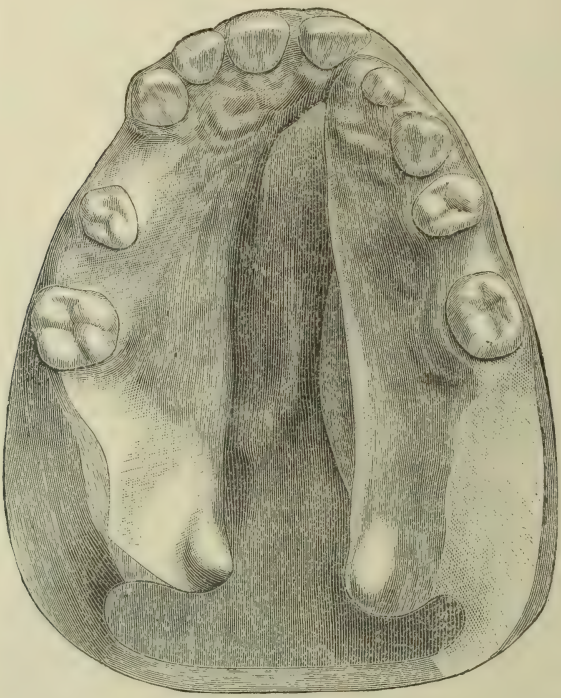
*Since this article was put in type, I read in the September COSMOS Dr. Patrick's disclaimer as follows: "In the report of the discussion which followed the reading of Dr. Marshall's excellent paper, I am made to say the reverse of what I did say in regard to the question of cleft palate and hare-lip."—N. W. K.

There is an impression, which I think is quite general, that the alveolar fissure in cleft-palate cases always continues along the line of one or both intermaxillary sutures; that is, that single cleft associated with single hare-lip separates the maxillary bones from the intermaxillary bone upon one side only, while in double cleft and double hare-lip the intermaxillary is separated on both sides, and has no union whatever with the maxillary. It is also quite commonly believed that the intermaxillary suture alluded to is the one that divides the alveolus *between the lateral incisor and the cuspid tooth.* I admit that in a majority of cases which have come under my observation the fissure in both single and double cases has been next to the cuspid, but that it is always so is an error.

FIG. 5.



I have here a number of models which indicate a variety of departures from that rule.

Fig. 5 shows an alveolar fissure between the *central incisor and the lateral incisor*, the lateral being on the maxillary side of the cleft. No incisor teeth are missing.

Fig. 6 shows an alveolar fissure with one central incisor missing, the lateral incisor being fully developed from the maxillary side of the cleft and adjoining the cuspid.

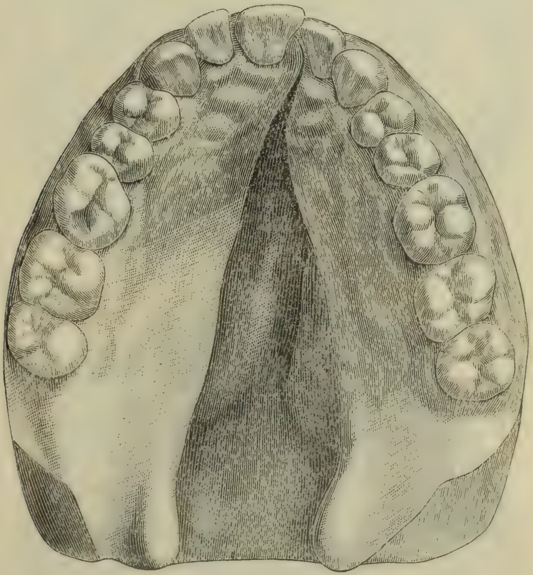
Figs. 7 and 8 show a striking similarity. Here also the lateral incisor is developed from the maxillary side of the cleft, but the two centrals and one lateral have gone off with the absent section of the intermaxillary. These two are undoubted double clefts.

In Figs. 9 and 10 the fissure follows both the median line and one intermaxillary suture next to the cuspid tooth. The remarkable fact here shown is that one-half the intermaxillary bone has gone with its accompaniment of one central and one lateral incisor, their mates retaining their normal positions. One of these fissures is an undoubted double cleft, and the other a single cleft. The missing portion of the intermaxillary is from the right side in one case, and from the left side in the other.

In Fig. 11 the alveolus is cleft apparently on the median line, but in reality between the central and lateral; upon both right and left sides that portion of the intermaxillary carrying the central incisors is missing, and the laterals in close contact are producing the appearance of an alveolar cleft upon the median line. This also is a double cleft.

I have also three casts, Figs. 12, 13, and 14, of a single alveolar fissure, showing the central and cuspid in close proximity and the cleft between them, but there is no evidence of a lateral incisor. This would indicate the possibility that that section of the intermaxillary bone had never been developed.

FIG. 6.



All the foregoing examples serve to confirm the theory that "fissure of the alveolus always follows the line of an intermaxillary suture." There are five intermaxillary sutures,—one on the median line, one between each cuspid and lateral, and two additional between the centrals and laterals. In early life there are four distinct portions of the intermaxillary bone, each portion carrying the germ of an incisor tooth; these parts all subsequently join the maxillæ by continuity of tissue, except upon the median line, where the two halves unite by suture. (See Fig. 15.) With this diagram in mind, it is not difficult to account for the missing teeth in the cast illustrations.

In Fig. 6 that section of the intermaxillary marked 3 in the diagram is undeveloped, and consequently that central incisor is missing.

FIG. 7.

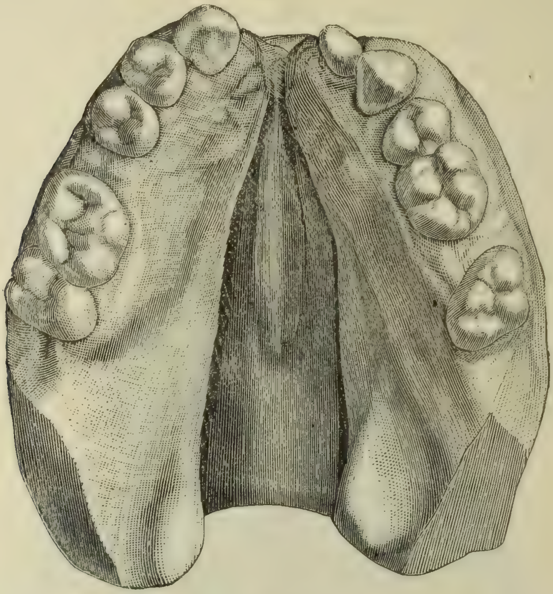
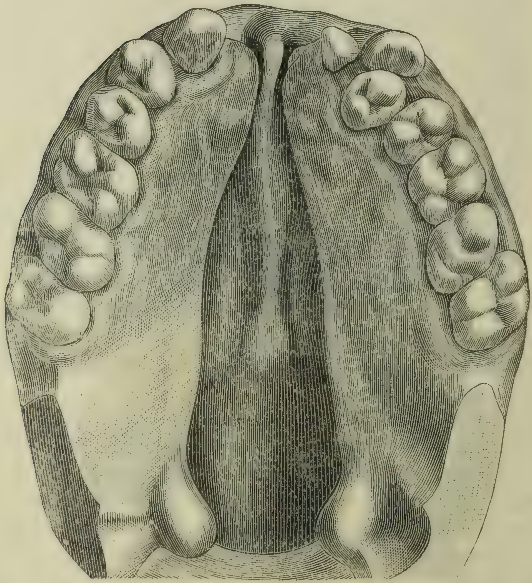


FIG. 8.



In Figs. 7 and 8 those sections of the intermaxillary are gone which are indicated by Nos. 1, 2, and 3.

In Fig. 9 the undeveloped section is equivalent to Nos. 1 and 2 on the diagram, while in Fig. 10 the missing parts are represented by Nos. 3 and 4.

FIG. 9.

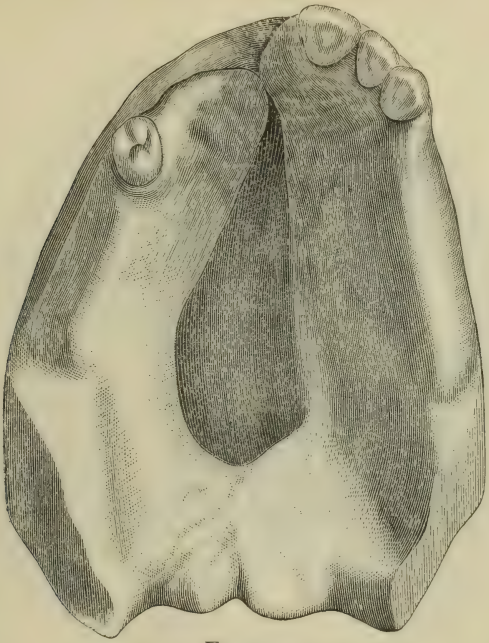
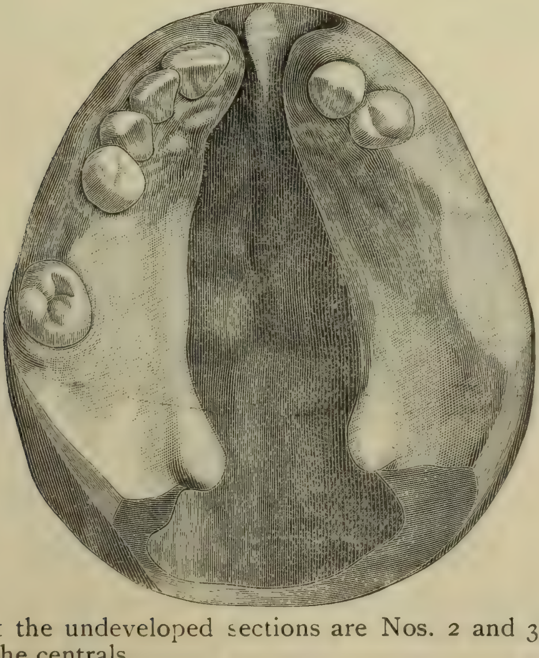


FIG. 10.



In Fig. 11 the undeveloped sections are Nos. 2 and 3, hence the absence of the centrals.

In Figs. 12, 13, and 14 the missing section is 1 or 4 on the diagram. As in these three cases there is no evidence of a lateral incisor, it is as reasonable to regard that section of the intermaxillary as undeveloped as to consider the lateral suppressed.

FIG. 11.

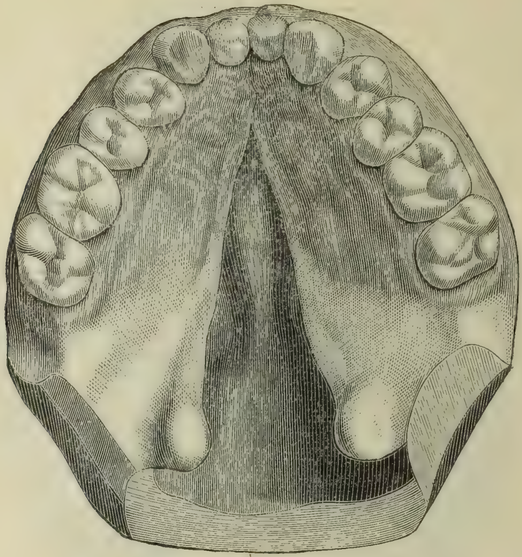
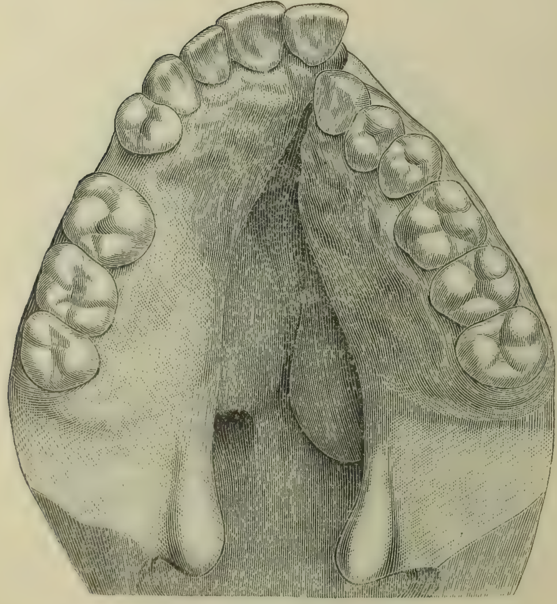


FIG. 12.



Thus does the statement become a fact that cleft alveolus always follows the line of an intermaxillary suture, but cleft alveolus does not always follow cleft palate. Beginning say with a cleft of the uvula, it will be found varying in extent, only stopping short of an actual division of the alveolus. I have here a model of a case (Fig. 16), with the fissure upon the exact median line reaching to the very base of the alveolus, and carrying, to my mind, evidence of a tendency to a

FIG. 13.

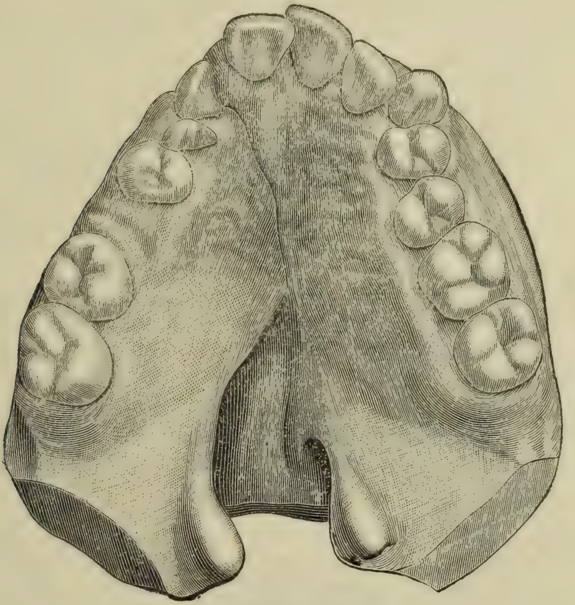
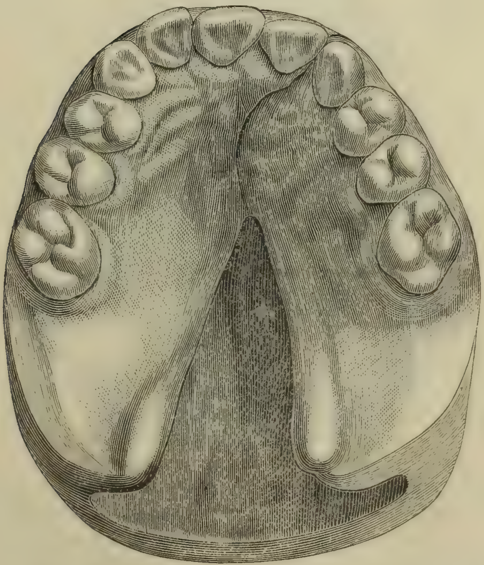
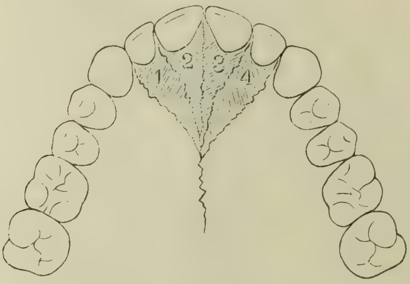


FIG. 14.



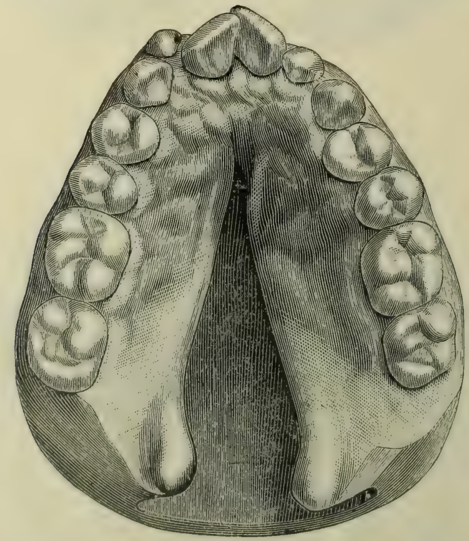
double cleft of the alveolus ; this evidence I see, with other aspects, in two dwarfed lateral incisors which are the counterparts of many lateral incisors which develop from the side of a cleft. I believe that if the alveolus had been cleft in this case we should have found sections 1 and 4 of the diagram missing, and sections 2 and 3 with the central incisors developed and joined to the vomer.

FIG. 15.



I have also an array of models here representing cases which I have treated in children from six to eleven years of age. I regard every case treated at that age as promising better results than those undertaken at a much later period of life.

FIG. 16.



I have yet to discover any objection to beginning early, even before the eruption of any of the permanent teeth. One of the most successful results which I have ever known is represented by a model here where not even the first permanent molar had arrived, and all the deciduous teeth save one were decayed and broken down to the gums. My attachments were made by putting gold crowns upon the remains of a temporary molar upon each side of the mouth.

I am not going to claim or maintain that one kind of an instrument is better than all others in every case of cleft palate. I am not going to assert that even the crudest and most cumbersome of the many devices which have been sent out by inexperienced persons with a flourish of trumpets may not have done some good. I will go further and admit that in some specific case, partly owing to a fairly good enunciation without any instrument, or to the not uncommon faculty of easily acquiring a new language on the part of the patient, and on the part of the dentist the good luck which sometimes favors a first effort, favorable results in articulation have been reached. I have seen clumsy and ill-contrived appliances—appliances which, in their construction, seemed to defy all theories of proper or scientific methods —which persons have accommodated themselves to, have managed with much skill, and derived benefit therefrom. So have we all seen some of the worst fitting, inartistic artificial dentures—work which was a disgrace to the profession of dentistry—worn by patients who derived such benefit from them in mastication that they could not conceive anything better. None of us, however, would admit that such a denture is a type or a model to copy in the introduction of artificial teeth.

The idiosyncrasies of cleft-palate people are quite as numerous as those of an edentulous people.

When I recall the success which, as I now remember it, attended my first two or three cases, I am led to think that I must have been extremely lucky in having favorable cases fall into my hands at that time; but when I recall some of the many hundreds which I have seen since, which in spite of all my increased knowledge and skill have only brought me disappointment and mortification, I am only too grateful that the first were not of that kind, else I should have been too discouraged to have ever undertaken another.

AN ETIOLOGICAL CLASSIFICATION OF PYORRHEA ALVEOLARIS.

BY M. L. RHEIN, M.D., D.D S., NEW YORK, N. Y.

(Read before the American Dental Association, August 8, 1894.)

THE various forms of pericemental inflammation, with their purulent discharges at the gingivæ and the subsequent loss of tissue, have been among the questions most disputed in discussion for some years. The etiology, pathology, and treatment of this disorder will continue to furnish fields for "battles royal" at our meetings until science succeeds in vanquishing this destroyer of the dental organs.

Too much valuable time has been consumed in discussing the various names that have been given to these conditions by different men. For years this disease was known by the name "Riggs's disease," in deference to the man who first called public attention to the feasibility of combating its ravages.

In 1877, at a meeting of this association, the name of "pyorrhea alveolaris" was first introduced by the late Dr. Rehwinkel.* After seventeen years of discussion, notwithstanding the objections of some of our ablest men, this name has secured a firmer foothold than ever. You might as well endeavor to eliminate dyspepsia from the nomenclature of general medicine as attempt to abandon the use of the term pyorrhea alveolaris.

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* The name was used in France previous to that date.

The name expresses clearly the clinical feature of a flow of pus from the alveolus at its gingival border. It has, however, been used indiscriminately by different men for every form of this disease, simple or severe, and has thus led, especially in discussion, to great difficulty in understanding what particular form of pyorrhea might be intended by different men.

Obviate this difficulty, and one source of contention is removed, and we can then devote ourselves to the more important fields of investigation and results, without having our time wasted by continued objections to the various proposed names, the discussion of which has so often resulted in drawing away our attention from the more important features of the subject.

With this object in view, I submit for your consideration the following plan of nomenclature.

Retain the name pyorrhea alveolaris as generally descriptive of any condition where there exists a flow of pus from the gingival border of the alveolus, and classify the different forms. A large number of practitioners still cling to the idea that all forms of this trouble are purely local in their origin, and that a permanent cure can be effected by local means. There is no question that lack of hygienic conditions, with all their attendant unsanitary surroundings, is at times the sole cause for very severe purulent discharges from the alveoli. This condition, which is purely local in origin and requires only local treatment, must be sharply divided from those serious cases where malnutrition and poverty of life-endowing corpuscles play so important a rôle.

Consequently we make two grand divisions:

I. *Pyorrhea Simplex*,—embracing all cases of purely local origin and requiring only local treatment.

II. *Pyorrhea Complex*,—embracing that larger field of more serious disorders and graver affections. These cases are often spoken of as "true pyorrhea" by some authors, "phagedenic pericementitis" by others, and the very latest addition to our category is "hematogenic calcic pericementitis." All these names have been coined because of the observation of certain peculiar clinical features about the alveoli, ignoring entirely the primary cause in this nutritional disorder.

The plan I have the honor to suggest for your consideration embraces the addition of a modifying word to all forms of pyorrhea alveolaris of the complex variety, this modifying word to be indicative of the etiology of the case in question after a satisfactory diagnosis has been made.

Under *Pyorrhea Complex* we make the following subdivisions:

A. Those due to nutritional disorders, among which may be especially mentioned: 1, gout; 2, diabetes; 3, chronic rheumatism; 4, Bright's disease; 5, scurvy; 6, chlorosis; 7, anemia; 8, leukemia; 9, pregnancy.

B. Those occurring during attacks of acute disease, such as acute infective diseases; among these may be mentioned: 1, typhoid fever; 2, tuberculosis; 3, malaria; 4, acute rheumatism; 5, pleurisy; 6, pericarditis; 7, syphilis.

C. Those that are due to nervous disorders; among these we might specify: 1, cerebral diseases; 2, spinal diseases; 3, neurasthenia; 4, hysteria.

D. Those conditions resultant from the toxic effect of certain drugs, such as: 1, mercury; 2, lead; 3, iodine.

E. Called *Pyorrhea Sequentia*, a condition of diseased pericemental tissue left behind after the primary cause has been cured.

With such a classification as this borne in mind, when a man speaks of "gouty pyorrhea," or "mercurial pyorrhea," or "tubercular pyorrhea," he is at once clearly understood.

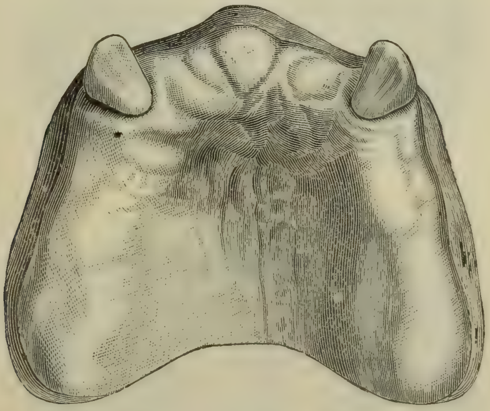
The pathology and treatment can then be discussed in a rational manner without the injection of entirely irrelevant matters.

NEW BITE-TAKING MEANS AND METHODS.

BY W. STORER HOW, D.D.S., PHILADELPHIA, PA.

A FURTHER series of bite-plate exemplifications following those of the article in the September DENTAL COSMOS appears appropriate in view of the mere mention therein of the peculiar adaptation of the bite-plate to partial dentures. Take, for instance, a case like that of Fig. 16, the superior cuspids only remaining. A sheet of thick tin foil, or of pattern tin, is to be cut to the outline of an upper bite-plate (Fig. 1), placed in the mouth, and with the forefinger rubbed onto the gum ridge and around the cuspids to show their relative positions. This rude pattern laid on an upper bite-plate will indicate the points to be cut out with plate nippers as at EE, Fig. 11. The bite-plane B may be sheared to shape, and the bite-plate by repeated trials in the mouth be quickly prepared to receive the wax for obtaining the preliminary bite-gauge as shown in Fig. 17. This when removed from the mouth will appear as seen in Fig. 18. When the additional wax for modeling and contour has been supplied the case will present the appearance illustrated in Fig. 19, the median-line mark shown being a transference from that of the plaster models after the bite had

FIG. 16.



been taken (as described in the previous article) and placed on the articulator as in Fig. 5. Another instance is given in Fig. 20. Here the pattern-plate procedure is the same as above described, the bite-plate being readily fitted so that a piece of the bite-plane B, Fig. 11, shall enter every space that is to be occupied by an artificial tooth or teeth. There is no risk of overestimating the value of this adjunct of the partial-denture process which results in an accurate bite ready

Fig. 17.

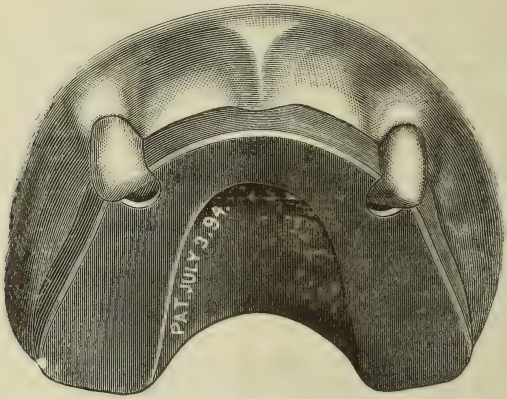


Fig. 18.

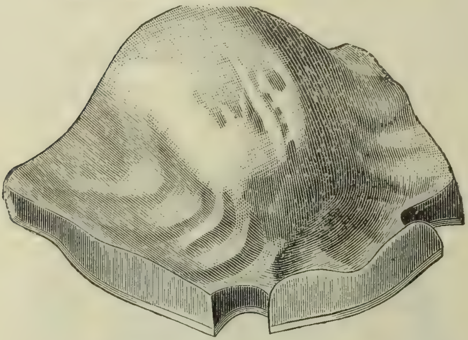
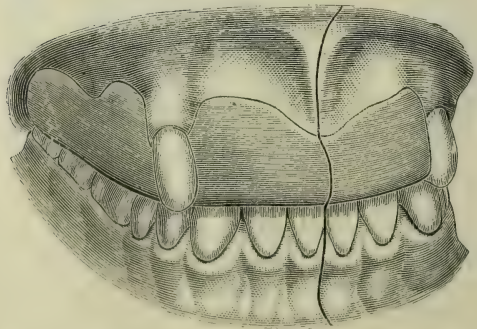


Fig. 19.



for transfer to the model when obtained from the succeeding plaster impression.

Fig. 21 shows the taken bite with the labial and buccal portions of the under wax cut away to illustrate a defect in the common process of bite taking, not in fact manifest in the present instance, because the cuspids and other teeth compel a correct closure that is evidenced by the thin films of wax at the points of occlusion contact seen on removing the bite, which is proven to be accurate when completed by the addition of wax over the labial and buccal surfaces of the lower teeth and a transference to the impression model on the articulator; the result being such as shown in Fig. 22.

FIG. 20.

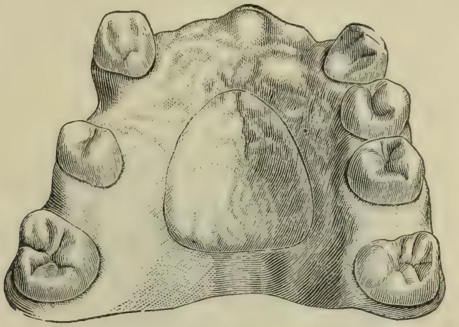


FIG. 21.

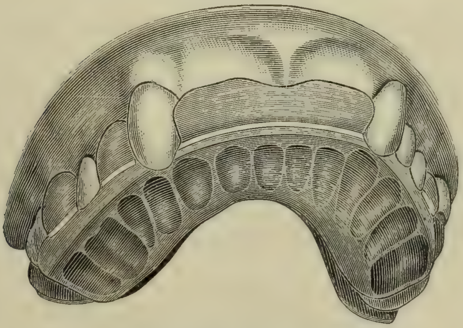
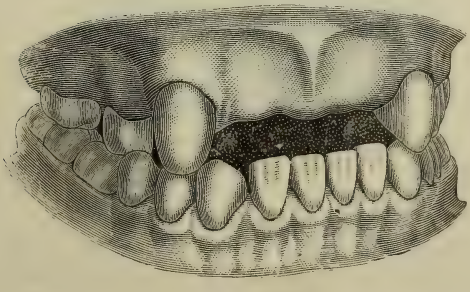
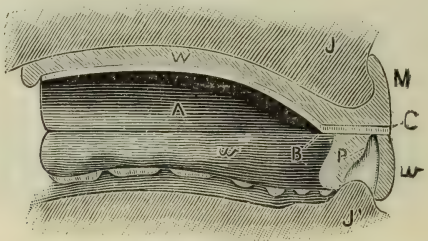


FIG. 22.



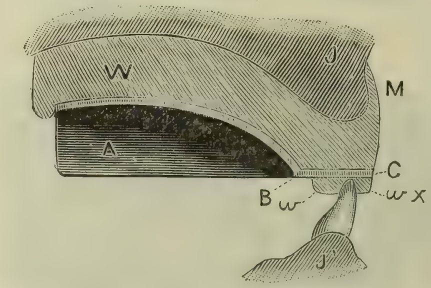
The common defect just referred to is the massing of too much wax on the under side of the trial plate, or bite-plate, and the consequent sliding forward of the lower front teeth as the inclined planes of their lingual surfaces are forced into the deep mass of wax somewhat as is observable in the case illustrated by Fig. 21, and is made further obvious by Fig. 23. There is no practical need for a bite impression of the lingual surfaces of the lower teeth below the point P, Fig. 23, while on the other hand there is a serious reinforcement of the natural tendency to lower jaw protrusion in the act of desired bite-closure when the wax is massed as above mentioned. The new bite-plate permits the use of merely sufficient wax, as in Fig. 24, to reproduce the cutting-edges and cusps of the teeth without any aid to the protrusive tendency whatever. While the teeth remain closed for coronal bite reproduction, additional wax may be pressed onto the labial and buccal surfaces of the lower teeth to produce as perfect a representation as is shown in Fig. 22.

FIG. 23.



It is hoped that the foregoing illustrations and descriptions will suffice as intimations of the manifold adaptation of the several bite-plate modifications to meet any and every case arising in practice, and as affording ready means for the obtaining a correct bite prior to the taking of the usual plaster or modeling-composition impression, yet at the same sitting.

FIG. 24.



The bite-plate method, while at the outset reasonably requiring the expenditure of some time and study, is still an economizer of both time and labor, inasmuch as it enables the dentist to meet the patient at the second sitting with a complete denture. In any case he may be ready with a trial-plate on which the teeth shall have been arranged and articulated so naturally that but slight alterations will probably be necessary. Especially will this be the case if instead of wax, as at *w*, Fig. 24, moldine shall have been used, and fusible metal poured in the coronal impressions to insure sharply-defined and non-abrasive cusps for accurate articulation.

PROCEEDINGS OF DENTAL SOCIETIES.

AMERICAN DENTAL ASSOCIATION.

(Continued from page 715.)

SECOND DAY—*Morning Session.*

THE association was called to order by President Patterson at 10 o'clock A.M.

The consideration of Section I, Prosthetic Dentistry, Chemistry, and Metallurgy, was resumed, and a new wire coiler made by The S. S. White Dental Manufacturing Company was explained by the secretary of the section, Dr. Boice.

Dr. V. H. Jackson, New York, read a paper entitled "A Method of Making Appliances for Correcting Irregularities of the Teeth,"* etc.

Section I was then passed, and Section II, Dental Education, Literature, and Nomenclature, was called.

Dr. Louis Ottofy, chairman of the section, read the report, an abstract of which follows:

No section reports having been made to the association in 1893, the present report covers a period of two years. During that time the following dental colleges have been established: Atlanta Dental College, Atlanta, Ga.; Birmingham Dental College, Birmingham, Ala.; Ohio Medical University, Department of Dentistry, Columbus, Ohio; University College of Medicine, Department of Dentistry, Richmond, Va.; Marion Sims College of Medicine, Dental Department, St. Louis, Mo.; Tacoma College of Dental Surgery, Tacoma, Wash., and Milwaukee Medical College, School of Dentistry, Milwaukee, Wis. The following have been discontinued: United States Dental College, and Tooth-Saving Dental College, both of Chicago, leaving forty-four schools in active operation and granting degrees. [The data given as to matriculates and graduates are incomplete, and therefore not printed here.—*Reporter.*]

The present dental school system of the United States presents more favorable conditions than at any time in the past, for which the National Association of Dental Faculties is largely responsible, practically all the colleges, whether members of the organization or not, being governed by its rules. During the past ten years the number of dental schools has doubled, and the tendency under the lax individual laws, each state being a sovereign, is to still increase. If every new college has as its motive the education of students in a more thorough and efficient manner, all encouragement should be given. At present the fad is to establish dental departments in connection with existing medical schools, which is usually an inexpensive way, requiring only the addition of three or four dentists to the faculty and the setting aside of two rooms in the college building for operative and technic purposes. While it adds revenue to the medical college, it does not usually add to the luster of the profession. It is not desired to deprecate this condition, for many of the dental schools operated in conjunction with medical colleges are among the best of the country; but there are two hundred and fifty medical colleges in the land, and the addition of a vermiform appendix to each might foster a dangerous disease.

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* This paper, on account of the impossibility of getting the illustrations made in time, is unavoidably laid over. It will appear, with the discussions, in the November number of the DENTAL COSMOS.

A radical change in the requirements for the admission of students is required. The method in vogue—of allowing each school to judge of the fitness of candidates—is faulty. The section would urge that the degree of Bachelor of Arts or its equivalent, obtained from a reputable university, should be requisite. The next important step which should be taken is the extension of the school year to nine months, and of the complete course to four school years.

Referring to the laws recently enacted by various foreign governments excluding graduates from American dental schools, the report maintained that as far as ability to actually benefit those in need of dental services is concerned, the American graduate is not equaled by the product of any foreign dental school in the world. In view of the restrictions placed about American dentists endeavoring to practice in foreign lands, it is only proper that we should demand from foreigners coming as practitioners or students compliance with the rules and customs here, especially a thorough acquaintance with the language; teaching and examinations should be conducted in English only, and credentials presented by foreigners should be closely scrutinized.

The two years have been prolific in papers on dental education. It has been suggested that a dental college cannot do justice to a larger number of students than teachers and demonstrators can come into actual contact with, because the men would not have sufficient actual practice. It would seem, in some instances, the number of teachers, or at least of the demonstrators, should be increased, while where it is impossible to supply sufficient clinical material the student should be advised to obtain privileges for practical work under the tutelage of practitioners.

As to whether it is advisable for a student to change from one school to another, the disadvantages of changing outweigh the advantages, and the better course would be for the student to select a good school and begin and end his course there.

The habit of undergraduates engaging in practice is an evil which ought to be readily controlled by requiring every student to sign, before being permitted to matriculate, a contract, which legal advice says can be enforced in most of the states, embodying a statement that he has not been for a period of two years engaged or employed or interested in a practice conducted on principles not in accord with the accepted code, and has not violated any dental law during that period; and an agreement to conduct himself according to the code, to obey the dental law, and not engage in practice unlawfully; any violation of the agreement shall entitle the college to erase his name from its records and report its action to the other colleges; that his diploma shall be held during good behavior only, the college having the right to cancel it and remove his name from the list of graduates for conduct not in accordance with true professional ethics.

Such a requirement would attract a better element, and coupled with the exaction of a high preliminary education referred to would exert a wholesome influence upon the entire dental fabric of America.

The section could see no advantage in a change of the degree which has been mooted. One of the most important steps in dental education is about to be taken, in the organization of an association by the technic teachers. Dental technics, introduced a few years ago by Dr. G. V. Black, will be an absolute necessity of the dental student's education.

The report referred approvingly to the use of outlines or questions and answers to subjects insufficiently covered by the text-books ; to post-graduate teaching as carried on by some of the colleges and by the Post-Graduate Association. The Universities of Michigan and Minnesota have established a regular course covering a year for graduates who desire to further improve themselves in any particular branch.

The section regretted that opportunity was not found at the World's Columbian Dental Congress to take steps looking toward the adoption of a uniform nomenclature.

Adverting to the means of educating the public in dental matters, the report commended a pamphlet gotten out under the auspices of the Isaac Knapp Dental Coterie, of Fort Wayne, Ind., but it believes the best way to impart this information is by parceling it out in small doses and at frequent intervals, giving a single subject at a time. As a model of the kind of reports the section would be glad to receive from all the dental societies, it presented the report sent in by the Washington City Dental Society, giving an account of its work during the year. A list of the dental books published was presented, with brief comments on some of the more important works, and the report closed with an announcement of the other papers to be presented by the section.

Dr. Frank Abbott, New York. The disposition in all educational institutions connected with dentistry at present is not only to make their teaching more thorough, but to extend the time of work. They are now considering the advisability of extending the courses to four years. In New York state it has been considered better in professional education to begin at the other end ; better to prepare a man to receive the professional teaching before he commences to pursue the special studies. The Regents of the University of New York deem this a better plan to secure a high standard than the extending of the qualifications required at the other end of the term of study. We can train a man pretty well in dentistry under the rules now in vogue, but the time is past when any man, no matter what his lack of early educational advantages may be, can expect to attain to the highest there is in dentistry. We now think it is better to have our men thoroughly prepared to receive a professional education at the start.

Dr. W. St. George Elliott was pleased to hear the remarks of Dr. Abbott. It had been his privilege to practice dentistry in nearly all parts of the world ; he had been a member of English dental societies for eleven years, and he had been sorry to come to the conclusion that the English, in dental education *per se*, were ahead of us. We are their equals in the technique of dentistry, but not in the breadth of scientific education, which with them is the foundation of the dental student's training.

Dr. W. H. Morgan. The success of the practice of dental surgery depends on tactical skill, and the last speaker seems to minify its importance. You can give a man the full science of medicine, and not raise a suspicion of his being skilled in the practice of dentistry.

Dr. Elliott had favored the four years' course as affording greater opportunity for scientific studies, but he did not in any way underrate the necessity for manual skill.

Dr. Abbott. The better prepared the student is to receive his scientific education, the better professional man he will be.

Dr. E. A. Bogue, New York. In view of the remarks of the last three speakers, perhaps it may be well to call attention to the fact that in Austria the student of dentistry must spend seven years in the study of medicine before he can begin the practice of dentistry; hence, there are no good dentists there.

Dr. Abbott. In that country no man can study medicine until after he has graduated from a literary institution, nor dentistry until after he has received his medical education; so that we would naturally say there are no good dentists there. Time does not count there as here. If a man comes through his studies at the age of forty he thinks he is doing well. Here he comes to the college at eighteen and wants to go to work as soon as he can, and at twenty-one or twenty-three he is ready.

Dr. Crouse thought there was one point which college men would do well to consider, and that was as regards undergraduates practicing. It is a fact that one-third of those who study dentistry do not practice after getting their education. Anything that would enable these men to find out their unfitness to practice dentistry before they have spent so many years in its study ought to be encouraged. There should certainly be some way of sifting out the unfit material, so that a man who was not suited to become a dentist should not use more than a year in finding it out. Perhaps it might do to let them try practice a little before they graduated.

Dr. J. Taft, Cincinnati. Perhaps it would not injure the undergraduate, but how about his patients? The difficulty is that before a man has completed his studies he is almost necessarily deficient, especially if he is in a school where they have a graded course. The man ought to have a thorough equipment before he is given a chance to treat disease. It is altogether wrong to encourage this idea of undergraduates practicing or attempting to practice. Some would go out and would win some success, and then they would not go back to the college to complete their studies, but would go on with their practice. The best course is to give them the best possible equipment before allowing them to go out to practice. To permit them to begin practice before they are qualified not only results in their personal failure, but the influence of that practice is prejudicial to the good name of the profession.

Dr. W. H. Morgan was willing to accept what had been said in the paper with the explanations that had been given. The broader the education, however, the better qualified is the man to help those in his care; but, after all, manipulative skill is the keystone in the arch of dental ability. There was another point in the paper to which he wished to refer. It put forth the idea that a young man who gets into the wrong way, who enters a "cheap John" establishment, should never be admitted to a dental college. Men make mistakes, and it is easy for a young man to make a mistake and get into an establishment of this sort. When he finds it out and wants to rectify it, we ought to take him by the hand and help him ; let him have a chance to recover himself. Again, they say a man ought to be thoroughly qualified before he begins practice. If they mean by this that he should know all he will ever learn about dentistry, he did not believe it possible. The schools ought to be prepared to teach their students sufficient to begin practice intelligently. More than this cannot be expected.

Dr. Crouse. If a student, after one course, takes a position as assistant, does it do him more harm, if he is found incompetent, to tell him so then, than to wait until he has spent another term in a room where there are hundreds of others receiving the same instruction?

Dr. James Truman. There is a practical side to this question under discussion. Where shall the line be drawn as regards preliminary education? He did not wish to be put into the ranks of those who are opposed to a high standard of requirements ; but he had become convinced from observation that just in proportion to the extent of his preliminary education is the student defective in technical skill. In a long experience in teaching he had found it impossible to make good technical dentists of students after they reached a certain age He could therefore understand why it was that in the old countries, where they require the certificate of the gymnasium or the *real-schule*, to obtain which takes until the student is twenty to twenty-two years of age, before he can begin his professional studies, and then from five to eight years more must be spent in study,—he could understand why, under these conditions, the manipulative skill of the dentists should not be so high as here. One result of this course has been that in England, the dental students, while up in theory, are deficient in practical matters. Now the question is, Where shall the line be drawn? and he held that until we are prepared to give sufficient qualifications in the common schools to enable the student to comprehend the teaching of the professional studies, the common-school education is where the line should be drawn. We don't want the European standards. What we are after is the making of skillful practical dentists.

Dr. Abbott. The matter of manipulative ability is of the highest importance. Dr. Morgan knew what he was talking about when he suggested that we ought not to keep out the young man who had made the mistake of entering a shyster office. Such a young man frequently, under the right auspices, becomes a shining light because of the manipulative skill he has acquired. What is any professional man good for if he is not a practical man? It is the same with us. The educated dentist without manipulative skill simply wastes his talents because he cannot apply his knowledge. Dr. Truman says that the reason why dentists in Europe are less skillful practically than here is that there they are twenty-four or twenty-five years old before they begin practical work. There is this other reason, that in those countries they lack the genius of manipulation which we have here.

Dr. E. A. Bogue, New York. The genius of manipulation is here because we are a republic, where one man is as good as another, and where practically every one learns to labor with his hands. He himself had had the good fortune to be a student in the office of the late Dr. Westcott, and Dr. Westcott's students were taught, first of all, to be mechanics. For two years before they began their studies in college they were taught to use their fingers. He could never forget the things learned there, and he was thankful in his work to-day for the instruction given him then. The school which makes the greatest effort to teach manipulative skill is the one which the experienced dentist selects for the son he intends to train as a dentist.

Dr. Taft. Professor Truman has said that we should draw a line for the study necessary before beginning the dental course. Is that all that is necessary? It would be reasonable to expect that a man claiming to belong to a profession should occupy a respectable position as regards his education. Ten years ago more than one-half the practitioners in dentistry were very defective in their ability to use their native language. It was revealed in their correspondence that there were many who could not write a page which was respectable in its composition. They were not orthographers; they did not possess the ability to construct sentences properly. It is time that this state of things be remedied, and to ask that a reasonable degree of general scholarship shall be possessed by every man who enters into the practice of dentistry. All that is required can be got before the young man is sixteen years of age, and it is not necessary to begin technical study before that time. What is needed is within the reach of every young man in this country, and it ought to be required of them. It is, in fact, a matter which ought to regulate itself. It is not necessary to have what is known by the term thorough culture, although those who have it when they enter college are head and shoulders above those who haven't it. With reference to a knowledge of Latin, which is now required at the entrance examination in some of the colleges, and has been suggested as a requirement in all, it is to be said that we want at least a good knowledge of our own language, and there is no better way to get it than by acquiring a knowledge of those tongues from which it is derived. Up to sixteen or seventeen the student should acquire his general education, which should not interfere with the time which should be devoted to acquiring technical instruction. If the course of training requires the student to go on until he is thirty years old, it is not his previous education, but the crystallization of mind and body which prevents his acquiring manipulative dexterity. Differences in manipulative ability do not depend on degrees of general education.

Dr. John S. Marshall, Chicago, agreed in the main with Dr. Taft's views, but he would go a step further. It stirred his blood to hear members of college faculties get up here and decry the need of a liberal education for dentists. If we are to have a profession of dentists they must have a liberal education, but they must also have medical knowledge. The men who write our text-books are those who have graduated in medicine and then studied dentistry. It is a step backward to oppose a liberal education. Dr. Taft also referred to the lack of general education among dentists. The editor of the DENTAL COSMOS says that what they need is scientific education. If dentists were properly educated these things would not be so. Some one says that we should pay more attention, in the training of dentists, to practical matters than to the theoretical. Dr. Marshall held to the opposite view. The only time for acquiring the theory of dentistry is while the student is at college. He will not spend time upon it after he graduates, but he will get practical skill or he will be a failure as a dentist. It is a mistake to make too much of the practical side. The English dentist is far ahead of us in the theory of dentistry. It would be a good thing if our young men would go there to acquire their theoretical knowledge.

Dr. Truman. Dr. Taft says the mass of dentists are ignorant. That may be true in the West; it is not true in the East. In his position as editor of a dental journal he is brought into contact with large numbers of dentists, and he does not find them ignorant. The papers which came to him as editor would stand very well, compared with those of medical men.

Dr. Taft replied that he did not say that the dentists were a set of ignoramuses. What he did say was that ten years ago there was a great lack of fundamental knowledge among them; but it is not so to-day, and we want out West to get up equal to our brethren in the East.

Dr. Kulp has always advocated a higher order of education as a preliminary to professional studies, more especially for dentistry. It is an open question how to preserve the faculty for acquiring manipulative skill and still have the necessary general culture engrafted. As bearing upon the point, he has found that the young men who have taken a mechanical course in college, which also strengthens and preserves their literary acquirements while giving them a practical knowledge of the use of tools, are the most teachable, when they come to take up the study of dentistry, of any he has ever had.

Dr. T. T. Moore, Columbia, S. C., thinks that the solution of the question of a higher education for dentists will be found in the endowment of the colleges. At least one-third of the men now received as students are not competent, and that is the fault of the colleges, or of the system on which they are conducted. The colleges must live upon the fees, and to get these they must have students, and so they keep these men who are not competent, and so long as these conditions prevail institutions will spring up all over the land. The practical solution of the problem is to endow the colleges. When this is done, and the colleges do not have to depend on fees for the payment of running expenses, the intermediate examinations will show the incompetent men,—that is, those who have not the faculties for the successful practice of dentistry,—and they will be dismissed, as in military schools. They ought to be allowed the opportunity as early as possible to choose some other calling. It is not right to keep a man three years in a dental college when he is not competent to become a good dentist.

Dr. H. J. McKellops, St. Louis, said that he was one of those unfortunates who commenced at the bottom. He was put into a dissecting-room, where he learned the human system, a knowledge which he had always found useful in the practice of dentistry. Now, does the oculist or the aurist ever look into the mouth to see if the teeth are giving trouble? The colleges could do something to raise the standard of dentistry. They could teach thoroughly, for instance anatomy, not merely of the part in which practical dentistry is most interested, but every part of it; then the students would know anatomy scientifically. Give him the man who can teach science;

but if you give the students a lot of patchwork, what can you expect of them in a scientific way? Because students are not thoroughly taught is the reason why there are so many poor dentists. He could hire any number he chose of dentists, graduates of dental colleges, at ten dollars a week. In order to get the best results in teaching students, we have got to start right. Give the student a chance to learn the finer manipulations; don't give him plastic work and expect him to be an ornament to his profession, but cultivate him so that he can do the best things.

Dr. B. H. Catching, Atlanta, Ga., has found that the negroes from the dental school in Nashville are thoroughly up in the literary department of their education. They have a written examination, and their answers to questions are nicely expressed. They are, however, as yet deficient in technique.

One feature which shows the general advancement of educational acquirements among dentists is their social position. It is not so many years ago when their social status was about the same as that of the chiropodist of to-day. That was because of the common lack of literary culture. Now they are beginning to be sought after in positions and relations which require the possession of literary ability.

The secretary read the report of the committee appointed to consider the suggestions in the president's address (before reported), which was received and made the special order for the evening session.

Adjourned till 8 o'clock P.M.

Evening Session.

The association was called to order by President Patterson.

Dr. Taft, from the Committee on Necrology, reported a suitable memorial of the following members of the association who have died since the meeting in 1892: Drs. Geo. Watt, W. W. Allport, W. H. Eames, A. O. Rawls, R. B. Winder, Edgar Park, A. P. Beale, Ambrose Lawrence, J. Smith Dodge, W. C. Wardlaw, J. H. Smith, M. H. Dodge, Fred. A. Levy, G. W. McElhaney, and G. A. Wells.

The report was adopted and ordered to be published in the Transactions.

Dr. Louis Jack, Philadelphia, read the report of the Committee on State and Local Societies, which was prepared by the chairman, Dr. Edward C. Kirk.

The report stated that the committee had prepared a series of topics (which were printed in the Transactions for 1892) for discussion by the various state and local dental organizations, and a copy was sent to the secretary of every dental society in the United States, so far as was possible. Only one response (from the Kansas State Dental Association) to the request for reports of the discussions had been received. Notwithstanding this, the committee was still of the opinion that the idea was valuable, and had already done much good, as the printed reports of various societies showed that the interest was widespread, and that the topics promulgated by the committee had furnished abundant material for study and discussion. The committee therefore recommended that the work be still further pushed along the same lines, and that another series of topics be formulated and issued upon the authority of the association.

On motion of Dr. Harlan, the report was received, the recommendation contained in it was adopted, and the committee continued, with authority to prepare and send out another set of topics.

The committee appointed by request of the chairman of the Dental Protective Association, Dr. J. N. Crouse, to examine its accounts, reported through Dr. H. A. Smith as stated in the Dental Cosmos for September, and on motion Dr. Crouse was given the privilege of explaining why he wished the investigation to be made. He said he was always glad to do the work, and there was no way by which the labor could be compensated ; but rumors had come to his ears which were unpleasant. These were not numerous until they began to put another brother on its feet. Both of these will go together. The Protective Association should take care of patent litigation, and not one dollar of its funds should be diverted from that purpose. We don't know where all the wrongs come in. We did feel that the old Goodyear Company was robbing us, but we need a united profession to prevent other schemes of similar character from being consummated. Three thousand men are not a united profession. We want to make the new supply company so attractive that those who have not so far come into the Protective Association shall do so. We want each member of the Protective Association to take one share in the new company, which, although it has been in existence less than a year, has already made good progress.

The special order, the report on the president's address, was then taken up and acted upon as reported in the Dental Cosmos last month.

The discussion on the report of the chairman of Section II, Dental Education, Literature, and Nomenclature, was then closed by Dr. Ottofy, who said that Dr. Abbott had stated that in some of the European countries a professional man was forty years of age before he got his education. The highest medical degree in the world is the M.D. in Sweden, which requires nine years' study, and there is not a degree anywhere which cannot be gotten by a man of twenty-five. The University of Chicago, with practically unlimited means, had ransacked the world of learned men to recruit its staff of professors, and there is hardly a man on its staff as old as himself.

With reference to the point which had been made that it was an injustice to keep a man three years at college when it was known to the professors that he could not make a competent dentist, he would say that some of the colleges are now asking incompetents to leave, because they thought it not just to let them go on. He knows that this has been done.

Permitting undergraduates to practice does not work well in Illinois, and whenever we find that any of our students are practicing illegally, we report the fact to the state authorities. Our friend from Tennessee (Dr. Morgan) misunderstood what the report said about men coming from unethical institutions. It did not ask that they be excluded permanently from the opportunity to acquire a proper dental education, but only to put them on probation for two years. Dr. Marshall has argued for the acquirement of the full medical education first before the dental training was begun. Dr. Ottofy did not care to reopen the question as to dentistry being a specialty of medicine, but would simply call attention to the fact that the other medical specialists are being educated to-day in the same way dentists have been; that is, their studies are directed, almost from the start, distinctly in the direction of the specialty they are to follow.

Dr. S. H. Guilford, Philadelphia, read the following report on nomenclature:

The subject of dental nomenclature has never as yet received the attention which its importance demands. While we claim for our profession that it combines both a science and an art, we are still lacking in that most essential requisite of a science, exactness of expression. The whole literature of dentistry teems with examples of words used interchangeably, which in many cases vary greatly in their shade of meaning, while others not infrequently fail to convey the meaning intended. We do not find this to be so in any of the other sciences. In the so-called exact sciences, mathematics, chemistry, and astronomy, as well as in the less exact ones, engineering, navigation, physics, and others, each part, factor, manifestation, or act has its single and appropriate designation. Were this not so, confusion would surely result, and sometimes disaster. In our haste and anxiety to further the material interests of our profession we have in large measure overlooked the character of the foundation upon which we have been building. We can never lay claim to being scientific until we have a vocabulary suited to our needs, and which will enable us to express our ideas correctly and without danger of misunderstanding or confusion.

Reports upon this subject, more or less satisfactory, have been presented before societies from time to time, the most elaborate one being that presented to the Columbian Dental Congress a year ago.

In addition to these reports, individual members of the profession have in some instances devised a nomenclature of their own and offered it for adoption, and if the originator happened to be a member of a college faculty his system has usually been adopted and taught in the school to which he belonged.

As each system proposed differed in many respects from any other, and as each one also embodied certain individual peculiarities that lessened its value in the estimation of the profession generally, all of these efforts, instead of simplifying and systematizing our terminology, have, on the contrary, added to the confusion. In view of these facts and the unquestioned importance of the subject, your section is of the opinion that some steps should at once be taken by this association to have prepared an intelligible, correct, and systematic nomenclature, which by its inherent merits will commend itself to the profession in general, and be adopted by them.

Your section believes that this end can best be attained by the appointment of a special committee, large enough to include one or more members especially interested in each of the departments of our profession, whose duty it shall be to carefully and studiously prepare a terminology that shall be accurate and at the same time simple enough to be readily comprehended.

The duties of such a committee, if properly performed, would be onerous and long-continued, but the benefit resulting would be almost incalculable.

Your section would also suggest the formal adoption by this association of the system of dental notation devised by Dr. Corydon Palmer some years ago, consisting of the use of the Arabic numerals to indicate the permanent teeth, and the Roman numerals to designate those of the deciduous set, with vertical and horizontal lines to specify the arch in which they are situated and the side of the median line where they belong.

Dr. M. L. Rhein, New York, read a paper entitled "An Etiological Classification of Pyorrhea Alveolaris."*

Dr. Truman called Dr. Rhein's attention to an error in his statement. The term Pyorrhea Alveolaris was used by the French writers long before Dr. Rehwinkel's paper was published.

Dr. Harlan. It appears in Wedl, which was published in 1868. He was not able to state as to its previous use.

Dr. Rhein was glad to have the correction, and hoped the secretary would change the statement in his paper.

At the next morning's session Dr. Peirce asked to say a word about Dr. Rhein's paper. It opened up the subject in a practical manner, and made an effort to differentiate the conditions found in pyorrhea. We have been treating all the manifestations of this disease as one for years. The groups of conditions vary very much, yet they have all had the same terminology. In the papers which the speaker has written upon the subject, he has stated that the first thing is to differentiate the origin of the trouble. He has said that the disease is of constitutional origin, and begins at or near the end of the root. This statement has been criticised by Dr. Black, who says he does not recognize the condition described, which is the same which Dr. L. C. Ingersoll described some years ago as a serumal deposit. Dr. Black has not seen, and is therefore not familiar with these manifestations. He states also that the gouty condition is not attended with suppuration. Dyce Duckworth says that while suppuration is not usual, it does occur, and he gives twenty-five or thirty instances where suppuration followed the deposition in the joints.

Dr. Abbott felt a good deal like Dr. Black, having never seen a case where there was a deposit at the end of the root without an outlet, and such a condition must be productive of a terrific abscess. He believes pyorrhea to be due to both local and constitutional causes; that it is a manifestation of constitutional trouble, localized in the mouth. He has heard it said that there was no true pyorrhea where there has not been ptyalism. At any rate, in some way nourishment is cut off and the pockets are formed in which the particles of the deposit find lodgment. If you examine the deposits on the sides of a tooth, where there is a large quantity, you will find particles of food, lime-salts, fat, etc. This may come from neglect in early life. Where tartar collects generally in the mouth, he thinks it due to improper assimilation. There would be no deposit if all the organs were properly performing their functions. It is perhaps true that there never is absolute perfection of tissue, so that organs improperly performing their functions are perhaps more common than is generally thought. The salivary glands are large reservoirs, and any interference with the proper discharge of their functions, from whatever cause, would tend to cause deposits of calcareous matter.

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* This paper will be found in the current issue of the DENTAL COSMOS, page 779.

There is too much talk about what we ought to know before we begin the treatment of pyorrhea. We should not bother about changes in the nomenclature of the disease until we know all about it. The multiplicity of terms engendered by the present course only tends to confuse the mind of the reader. The term pyorrhea alveolaris is sufficient to indicate pretty clearly the condition to which reference is made.

Dr. Guilford. Is the manifestation of pyorrhea always visible at the gum line?

Dr. Abbott. Yes.

Dr. Crawford was of the opinion that pyorrhea never occurred without the precedent condition of an issue, whether under the margin of the gum or near the apex of the root. We don't have the characteristic pocket or the variable character of symptoms classed under this head without an issue. It is the second most destructive pathological condition of teeth, and he rather agreed with Dr. Abbott as to the terminology or nomenclature by which to express it. He was pleased with Dr. Rhein's paper, and if it had used the qualifying terms simple and complex, he would have little to criticise in it. He liked simple language, and thought that the nearer we got to the original language in our descriptions the clearer they will be. By an issue he meant a wound or an opening by which entrance is afforded to the disturbing element.

Dr. Rhein said that the discussion this morning, added to his observation for twelve years, confirmed the views put forth in the paper which he had read last evening. It is well established that good observers confront one another year after year with the statement of having seen some particular feature which their opponents have not. If some one else reports having observed symptoms which he has not, he is willing to believe that the observer has had the opportunity to see something which he himself has not. He believes these various clinical forms of the disease commonly called pyorrhea alveolaris, which have been reported from time to time, do exist, and sometimes without perceptible opening to the surface, a condition of which Dr. Black attempts a solution. For himself, he cannot account for such varying descriptions, except he admits that various causes have had their effect on the system at large. Upon one point made by Professor Peirce he desired to say a word or two. The suggestion which he quotes from Dr. Cravens, that the trouble is due to a deposit from pus, may strike some as new or novel. It is a somewhat crude statement, but it has considerable evidence to back it up. The question of the supposed agency of the urates in the causation of pyorrhea is not yet settled, and it will not for some time to come be known whether the cause of the disease is urates, exudates, or something else. At present the preponderance of the evidence is that the deposits are not exudates, but the result of a retrograde metamorphosis carried to its ultimate. That theory would account for the fact that we do not always meet the characteristic deposits in pyorrhea, on the supposition that chemical changes had occurred before the deposits were made. He wanted to put these ideas before the profession,—not that they are proved to be true, but that the preponderance of opinion now is in their favor. The statement is frequently made that extraction of the teeth will end the trouble. Why does extraction end pyorrhea? This brings us back to the fact that pyorrhea is frequently the only symptom of commencing decadence in people whose health is beginning to be undermined. Why should the inception of decaying health show itself preferably in the mucous membrane? The solution of this question had been made clear to him many years ago by Dr. Atkinson, who demonstrated to him that no other tissue in the body was so near to protoplasm as the mucous membrane about the teeth. It differs from all others, is totally deficient in cartilage, is soft, and one of the most vulnerable sockets we have.

Dr. Marshall said that three years ago he read a paper before the section on Oral and Dental Surgery in the American Medical Association, at Washington, on the gouty diathesis as manifested in the pericemental membrane, in which he took the ground that Dr. Ingersoll was not correct in his statement that pyorrhea alveolaris was due to an inflammatory process, and claimed that it was a uric-acid deposit, a urate. The paper also stated that he frequently found cases where there was no connection between the deposit and the gum-margin. In these cases he has found no external opening until one was made with the bistoury. He also said, and he believed he was the first to say it, that the deposit in such cases would be found to be made up of urates of soda. Dr. Peirce's observations have confirmed this view, and, in the speaker's opinion, Dr. Black in his recent paper upon the opposite side of the question has proved our position. Dr. Black thinks because the urates were not found in the salivary secretions, therefore the patient was not gouty; but there was no examination of the urine to prove he was not gouty. Many times, as said in the paper, the first symptom of acute rheumatism is seen in the urine.

The method of treatment of cases of pyorrhea which the speaker has followed seems to prove that the disease was due to the gouty diathesis. He stops the patients eating meat, drinking wine, and directs them to let fermented liquors alone. He allows them to drink a little whisky or gin if they must have a stimulant of this sort, and puts them on lithia or distilled water, the last preferably. While patients are on this diet they do not have exacerbations of this trouble, and the results, he thinks, prove that the trouble comes from the uric-acid diathesis. He considers Dr. Rhein's paper an excellent presentation, although it omitted some things which it might have said. Displacements of the uterus have caused pyorrhea, as evidenced by the fact that cases have been cleared up by treating the displacement, and without surgical treatment of the teeth. Pyorrhea alveolaris is not always of constitutional origin. It may often arise from local causes, like uncleanliness, calculus, etc.; other cases are systemic in origin.

Dr. Crouse had not supposed that the observers would split on such a question as that with reference to deposits on the ends of roots before there is any break of the tissue. He has seen a number of cases, and in several his diagnosis was confirmed, on the extraction of the suspected tooth, by the discovery of a small deposit of tartar near the apex of the root. They have usually been molars, and sometimes only one root has been affected. In one such case which occurred previous to the death of the late Dr. M. S. Dean, a very small deposit, as black as jet, was found near the point where the pulp passes out of the root. The tooth was a first permanent molar. Two years later the patient had the same trouble in the other upper first permanent molar, with the same result. At his office, where the specimens are, he could demonstrate so clearly as to convince the most stubborn, that these deposits can exist upon the roots of teeth without an external opening. Sometimes he dresses the teeth off to make them comfortable for a while until the diagnosis is confirmed, but he has come to the point where he does not trifle long over the life of the tooth when once he is convinced that this is the trouble, which he regards as one of the most destructive of the diseases which affect the teeth, and one of the hardest to manage; in fact, he considers it incurable.

Dr. H. B. Noble, Washington, D. C., has been intensely interested in the papers on pyorrhea by Drs. Peirce and Black. For himself, he has changed his opinion upon this disease within the past two years, and he now believes in the substantial correctness of the position advanced by Drs. Peirce, Marshall, and Crouse. The cases may be rare in which there is a deposit upon the root with no external opening, but they unquestionably do occur, as it has been demonstrated in his own practice; the majority of cases start from the gum-margin.

Dr. W. H. Morgan had never yet met with a case of deposit on the end of a root but that it had an opening to it, either along through the alveolus or along the canals of the root,—not a case. He repudiates the idea that after calculus is formed it is ever absorbed. There is no history in surgery of such a thing. It may sometimes be wandering, but it is never absorbed. So far as he knows, nature has but three ways of getting rid of foreign bodies. One of these is by absorption, but he never saw a case of absorption of a calculus. As to the origin of the calculus in pyorrhea, he had been inclined to accept Dr. Ingersoll's doctrine that it is serumal.

Dr. Crouse wanted to emphasize the idea that this trouble is more likely to occur where the teeth are sound. He had one patient who lost four teeth from it,—teeth with no sign of other trouble but this. One of them, however, had an ossific enlargement around the root, which perhaps might have caused the difficulty with this particular tooth. All of those just referred to were upper teeth.

Dr. Abbott had an idea that perhaps cases of hyperostosis have been mistaken for cases having this deposit. The last speaker put it that way. It is possible that every one of these patients may have been suffering from enlargement of the cementum brought about by some cause which does not appear.

Dr. Peirce wanted to state two or three of the evidences of the connection between this trouble and the gouty diathesis. Every writer and clinician on gout speaks of the wasting away of the alveoli and the falling out of the teeth in gouty subjects. Again, it is customary to assume, when quinine effects a cure, that there has been some malaria. Now, when a patient with pyorrhea gets well when put on gouty treatment, we have the same right to assume the existence of gout. He then described a typical case, which had occurred within the year, and which he said was only one of many, where remedies directed to the cure of the gouty conditions eradicated the pyorrhea, from which he thought it a fair assumption that there is a kinship between this trouble and those conditions.

Dr. Rhein has had cases similar to that described by Dr. Crouse, and he would emphatically refute Dr. Abbott's assumption that an entirely different condition was present. It merely brings out the fact that those who make such suggestions assume that other men do not observe correctly. In cases of the sort referred to Dr. Rhein has had good results from pulp-extraction.

Dr. Taft would suggest the appointment of a special committee to investigate the subject and report at the next annual meeting. One factor which may and probably does enter into the production of the condition under discussion has been entirely overlooked in the discussion so far, and that is the non-use of the teeth concerned. It has been said that this affection has its initiatory step in defective nutrition. When a tooth is not used, elongation occurs. How does elongation occur? By a thickening of the tissues in the socket, so that the tooth is thrown up. This occurs not only in men but in animals, and indicates a change in the membrane about the unused tooth, which does not receive normal nutrition and does not perform normal function. Some one has made the suggestion that the condition just described is analogous to alveolar abscess. They are not at all alike. In alveolar abscess there is a loss of structure all about the affected tooth. In pyorrhea alveolaris this is not true. The destruction is confined entirely to the periosteal or pericemental structure. There is no large pocket extending out into the soft tissues, so that the pericemental structure only is involved. Who can say how much non-use of the teeth is responsible for this condition? Take any other joint in the body and keep it absolutely from movement, and how long before a change will be found in its ability to move? In the gouty diathesis something is precipitated from the fluids of the body into the joints; and this leads to the conclusion that pyorrhea alveolaris is in the main local in its origin, but systemic conditions have much to do in directing and modifying its progress. Sometimes unused teeth will not show signs of elongation for years. In such cases we commonly find that they are used to some extent, but not as they ought to be.

Dr. Taft, in concluding, moved the appointment, as he had previously suggested, of a committee to make a special investigation of the subject.

Dr. Marshall. It is easy to diagnose pyorrhea from alveolar abscess. The last always comes from a dead pulp, and this is one of the things which must be excluded in the diagnosis. In difficult cases, when he is positive that the trouble is not alveolar abscess, he uses the faradic current, with a McIntosh apparatus, and he gets an instant response if the pulp is not dead. He has tested the matter by drilling through the enamel to demonstrate that the faradic current will absolutely tell whether the pulp is dead or alive.

Dr. Bogue seconded Dr. Taft's motion for the appointment of a committee to investigate pyorrhea, and suggested that Dr. Marshall be one of its members. One fact not mentioned in this discussion is that there are three causes of roughening of the upper ends of the upper teeth: 1, from deposits of calcareous matter; 2, from absorption; and 3, from causes beginning at the cervical margin. In regard to the second, he had recently extracted a tooth, after six months of treatment, on the roots of which he found a good deal of absorption, but no hyperostosis. It was as sharp as a needle on three or four points.

Dr. Crawford held that it is important to determine when the disease passes from the inflammatory to the suppurative stage, as there is then a distinct modification of the symptoms.

Dr. W. H. Morgan. How did Dr. Bogue determine whether the condition he reported was the result of malformation or absorption?

Dr. Bogue replied that the patient had been in his hands sixteen or seventeen years, and had lost tooth after tooth from pyorrhea. The others lost all showed salivary calculus. There was no such deposit in this case, and on comparing the tooth with the others previously lost from the same mouth, he saw what he believed to be absorption.

Dr. A. W. Harlan, Chicago. With reference to deposits on the roots of living teeth, where there is no external opening, no evidence has been offered that they originated while the patient was suffering from gout or rheumatism. Nothing has been shown to prove that antecedent conditions had not occurred to produce this deposit through the agency of micro-organisms. The rarity of finding these deposits where there is no break of the gingival margin, and the fact that no particular investigation has been carried on to show that the deposits in such cases show different characteristics from those found where there is a break, detract from the value of the evidence. He did not dispute that such deposits have been found, but he did dispute that a sufficient number had been found to establish the claim that they were owing to the uric-acid diathesis. He wished to say that without the formation of a nidus of some character on the cementum itself, without the aid of micro-organisms, such deposits will not take place. All experience showed that they could not be produced without micro-organisms. There must have been, in the instances reported, a stagnation of the blood-current at the point involved, and the concretions were deposited through the agency of microbes. The microbes of gout and rheumatism have not yet been found.

Dr. Taft. From whatever source the deposit comes, it is in solution while the tissue is in an abnormal condition. He has taken out teeth with this affection where there was no deposit. Shall we therefore conclude that there is none of the constituents in the plasm? On the contrary, he thinks it is always there, and it is deposited on the root of the tooth, because the solvent is no longer able to hold it and the root of the tooth affords a place of lodgment. A change in the solvent may be brought about by conditions within itself, so that it is no longer able to hold certain matters in solution; or they may be precipitated by some foreign substance coming in contact with it. His impression is that these deposits are merely coincident and not brought about by a general condition, as in the gouty diathesis. What we want is the elucidation of these problems.

Dr. Rhein. Pyorrhea, in all the complex varieties, is distinctly the result of malnutrition. Dr. Taft's suggestion as to the connection of non-use was well brought out, and Dr. Harlan's point that there is no clinical evidence that the deposit is the result of the gouty diathesis was well taken. There was no time now to go over the evidence in detail, but Dr. Rhein denied that there was necessarily a gouty condition as the cause of pyorrhea. Any neurasthenic condition may be followed by pyorrhea, and the toning up of the system produces an amelioration of the trouble. The gouty diathesis is not at all necessary to bring about this deposit upon the roots of teeth.

Dr. Taft renewed his motion to appoint a commission of five to investigate the subject as thoroughly as possible, with authority to draw upon the treasurer for any reasonable sum to defray expenses, and report to the association next year.

The motion was adopted, and the following were appointed upon the commission: Dr. C. N. Peirce, chairman; J. S. Marshall, Edward C. Kirk, M. L. Rhein, and J. Taft.

Dr. Abbott offered a resolution that it is the sense of this association that no state board of dental examiners should examine any person who is not a graduate of a dental college for license to practice, or grant a temporary license to an under-graduate.

Dr. Peirce. It must be remembered that state boards of dental examiners are established for the protection of the public, and they have no right to ask a candidate where he got his qualifications. They are bound to examine him, if he insists on it, to see whether he is competent to practice.

Dr Fillebrown. The boards of examiners act under laws, and most laws say they shall examine.

Dr. B. Holly Smith moved to refer the resolution to the committee appointed to take into consideration the unification of state laws regulating practice.

Adjourned to 9.30 o'clock Thursday morning.

(To be continued.)

SOUTHERN DENTAL ASSOCIATION.

(Continued from page 724.)

SECOND DAY.

THE morning hour was given over to the clinics.

Afternoon Session.

The association was called to order at 3.30 P.M.; President Smith in the chair.

Dr. H. D. Boyd, Troy, Ala., showed an appliance for expanding the arch where necessary in regulating the teeth. It consisted of a vulcanite plate with pieces of soft rubber tubing tied to it in such positions that the elasticity of the soft rubber would exert a constant pressure upon the teeth required to be pushed outward. He had used the apparatus successfully upon one of his patients, expanding the arch and drawing the bicuspids into position.

The report of the Committee on Education being called for, the chairman, Dr. I. N. Carr, Tarboro, N. C., read a report, in which he stated that the need of a good college education as a preliminary to any special branch of scientific learning is fast being realized ; the dental student requiring in addition mechanical ingenuity. The report also referred to the advance in the requirements for matriculation of the dental colleges, as the most advanced step for the improvement of dentistry, in which its writer saw an augury of the day when dentists would be recognized as educated scientific medical men practicing a special branch of that noble science. While testifying to the complete equipment of the best dental colleges for teaching the advanced branches, the report thought the very numbers of students in attendance would prevent correct teaching of the fundamental studies, as, for instance, anatomy, where to gain correct knowledge the student must be able to follow closely every step of the demonstrations, which in a large class only those near the demonstrator could do. Reading under a preceptor before attending college was likely to be useless, while a year at a good preparatory school would be of incalculable benefit. The report urged as the highest obligation of the dentist the perfection of his own character, in order to properly influence others, keeping continually in view the connection between the intellect and the moral constitution.

Dr. H. B. Noble, Washington, D. C., read a paper, entitled "Education and Legislation," of which an abstract follows :

Dr. Noble's paper was a plea for the universal validity of a diploma from a reputable dental college, and for the unification of state laws to that end. When a lawyer, he said, is admitted to the bar, he is thereby freed from further examination, his standing as a lawyer among his professional brethren is his credentials, and his indorsement by one or more of his profession gains his admission to practice in any court. He can be disbarred from practice for misconduct or dishonesty, and if dental laws could be made to debar those who prove unworthy or incompetent, by all means have such a provision, as in the dental law of Connecticut, which provides that under certain conditions the examining board can cancel the certificate or right to practice.

If the object of the examination of graduates by examining boards is to raise the standard of the colleges, let the examination be before, not after, the issuance of the diploma, so that it may represent both the board and the college. As to whether an examining board or the teachers in the colleges were more competent to examine students, the answer was clear that the college professor, by his daily labors and associations, is better qualified to judge of the competence of the student. If it is believed that any of the colleges are not educating their students up to a just and proper standard, let us have an investigation, that we may know what colleges are up in their teaching and recognize and honor their diplomas, and weed out the incompetent. Dr. Noble favored the presence of teachers in the dental schools on the examining boards, not only because they are the best qualified for the duties, but to form a friendly connecting link in the interest of the harmony which should exist between examining boards and colleges ; and he suggested the appointment of joint committees by the national associations to harmonize the laws and promote dental education.

Dr. A. W. Sweeney, Washington, D. C., read a paper on "Dental Legislation," of which an abstract appears below:

Referring to a paper on the same subject which he had read at the union meeting of the Maryland State Dental Association and the Washington City Dental Society in May (see DENTAL COSMOS, July, 1894), Dr. Sweeney regretted that the lack of time had then prevented the fullest and freest discussion of the debated points involved. That part of the very limited discussion indulged in which seemed adverse did not, in his belief, develop any argument whatever in support of such phases of dental legislation as he felt called upon to condemn. Dr. Sweeney then replied briefly to some of the criticisms, and, to prevent all misunderstanding, asked to be permitted to declare plainly that he *is not* opposed to dental laws, provided they are designed to accomplish only proper results. Far from being opposed to dental laws, he hopes to see them grow broader, more comprehensive, more effective, aye, and in certain respects far more stringent as well, than many of those narrow and distorted contrivances which, in the words of Blackstone, "disgrace" the statute-books, not only of the United States, but of other civilized countries. He hopes to see laws which will not "wink at" the prosperous and arrogant quack, while they are made to terrify the struggling graduate who has just parted with his scanty hoard to learn how to earn an honest living, and are held up as a menace to the practitioner from another state or country, whose ability may be great and his intentions most honorable; laws which, if not "retroactive," shall define more closely malpractice in dentistry, and restrict the wholesale and reckless abuse of anesthetics, both general and local, with the consequent shameful destruction of human teeth, which not only inflicts incalculable injury, but fosters and panders to a false and pernicious sentiment, calculated to prevent honest and competent service being sought, and to perpetuate that ignorant and injurious idea that the dentist is merely a tooth-puller and maker of false teeth.

Would it not be vastly more commendable to attempt legislation along such lines than to expend all effort in devising means calculated to render it more or less difficult to commence practice, but devoid of all effort to impose any wholesome restraint upon those disposed to practice dishonestly?

The lack of judicious provision in the laws for the suppression and prevention of practices injurious to the public constitutes their most conspicuous weakness, while the evidences which they disclose of efforts on the part of their framers to incorporate in them monopolistic tendencies must be justly regarded as their reproach. A great part of the adverse criticism noted against the dental laws can be traced to obvious efforts to embody provisions which tend to give to dentists already in practice at the time of their passage an advantage over those yet to enter.

So long as dental laws place legal obstacles in the way of competent and worthy persons under the plea of protecting the public against incompetence, and men lend their aid to the procurement of legislation because of their craving for the distinction supposed to attach to a position on an examining board, while the avowed and true aim of such legislation is neglected, unfavorable comment should create no surprise. So long as unblushing charlatans are permitted to flourish while the law is held up as a menace to the graduate about to begin practice, or the competent and well-meaning practitioner from another state or country, so long will dental legislation be denounced as a delusion, if nothing worse.

Without any attempt to dictate, or even to institute comparisons between the various measures, precedents can be found which might be studied with profit by those who really desire to see dental laws substantially improved.

At least two of our own laws, those of Connecticut and New Mexico, contain provisions for revoking as well as for granting license to practice.

The laws of the German Empire are not only very severe on all quacks, but provide for the punishment of editors and proprietors of newspapers who advertise quack nostrums.

A gentleman who practices in South America writes : "All anesthetics are prohibited to the dentist in the Argentine Republic."

It is entirely possible that every one of these laws contains very objectionable features, but they contemplate a more practical effort toward the protection of the public against injurious methods of practice than the laws which simply demand that those commencing practice shall undergo an examination. It must be borne in mind that the public sometimes demands a voice in measures for their protection when those having the matter in charge are too persistently forgetful.

While certain provisions in some of the dental laws in this country have been heartily condemned by many of the best men in the profession, we not only find them still in force here, but vastly more unjust and unreasonable laws than were ever before known have lately been enacted in Europe, and labored if not convincing arguments support the claim that there is nothing in these laws not justified by the necessities of the case, or to which a professional man need hesitate to give support. It may be difficult for us to estimate their necessities, but in spite of the familiar excuse about different standards of preliminary education and difference in the length of the college term, not only do we know, but the intelligent public in Europe know, that any assertion that the average American graduate to-day is less fit to render valuable practical service than the graduate of any dental college in Europe either proceeds from ignorance or is inspired by prejudice.

Dr. Sweeney then referred to the editorial in the June issue of the DENTAL COSMOS, entitled "American Dental Competition," containing an extract from the *Medical Press* commenting on the changes in the British Dentists Act, and the reply of the *British Journal of Dental Science* thereto. Concerning the last, he says that it is not the usual custom of those who seek "protective legislation" to point out too clearly their most potent reasons for urging its adoption. Similar attempts, here and abroad, to explain away the all too-evident intent of the many sweeping measures seem to justify the conclusion that those who stand up in defense of such legislation will resort to any artifice which may suggest itself in lieu of direct convincing argument, but in the candor of unguarded private conversation they sometimes, like the London practitioner mentioned in the former paper, frankly propose "to shut down on the whole business."

We come now to a consideration of the small number of our laws which, though they do not actually exclude the graduates of our colleges, compel them all to undergo an examination before admitting them to practice. It is pertinent to ask wherein the plain facts, undisguised by any specious argument, justify a law in Massachusetts, New Jersey, Colorado, or the state which now entertains so many of us as her guests, which accords no recognition to a diploma or to a certificate from another state board of examiners.

That this is an important question none will deny. That there is a radical difference of opinion as to its justice, utility, and necessity is abundantly proved by the discussion evoked by the attempts to maintain it. That the vast majority of reputable practitioners are opposed to the arbitrary enforcement of this provision is obvious.

That there are very serious objections to a law which absolutely ignores the possession of a diploma has been pointed out repeatedly. That the determined effort to enforce all the provisions of these few laws has been the cause of hardship and oppression to worthy persons is susceptible of ready proof, while it cannot be proved that they have occasioned any very much higher standard of attainment among those who practice under them, or that they have better served to rid the communities of charlatans than the laws which are more lenient toward regular graduates. That the impression has been steadily gaining ground that in certain respects these laws are too arbitrary was clearly indicated when it was announced early in the year that the National Association of Dental Examiners would take some action in the matter this present summer.

Some claim that the dental laws, especially the more exclusive ones, have brought about all the advance in dental education noted within late years. Those inclined to such views might well reflect that dental colleges came into existence and attained to a position of respectability before the laws succeeded in attracting attention, and with the general tendency toward advancement in all educational institutions it would be strange indeed if dental colleges only should stand still. To claim that laws admitted to be imperfect and experimental are to be credited with all the late improvements noted is to assume a position that is inconsistent if not discreditable.

We shut our eyes to the true "logic of events" when we fail to see that such of our laws as ignore our own college degrees furnish ready pretext to those willing to go farther, and it certainly would offer great hope of gratifying improvement to "call a halt" on all *ultra* exclusive legislation in this country, long enough, at least, to go over every phase of the subject with far greater care than any of the laws now in force seem to have received.

Personally, Dr. Sweeney is opposed to that feature of certain laws which deprives the college faculties of the right of determining when their students are competent to practice, by decreeing that no graduate shall commence practice without first submitting to an examination by a board of examiners, and it is his belief that a persistent adherence to that policy will not only lower our colleges and their graduates in the eyes of other nations, and thus rob us of that preeminence which American dentistry has so long and so justly held abroad, but will perpetuate a bitterness of feeling and foster a tendency to mix methods which belong more properly to the realm of politics into our professional relations, until we shall find ourselves confronted with stagnation if not retrogression.

With reasonable allowance for difference of conditions, the need for legal regulation of dental practice is the same in all the states. Hence where, of two states, one admits graduates to practice without an examination and the other does not, they cannot both be right. The true issue is, Which measure will the better serve the interests of the people of the state?

There is only one line of reasoning through which the solution of this problem will ever be reached. Admitting the need of education, where is it best to be obtained, and how and by whom shall it be determined when an individual has obtained it in a degree sufficient to fit him to engage in practice?

For many years after the establishment of the colleges that question was regarded as settled, and the immense influence thereby disclosed in the rapid advance of dentistry is known to all; but a new phase of the question has arisen, and the answer can only be found in the reply to the query, Do the colleges supply the education needed by their students, or do they not? and are the faculties competent to decide when a given student has acquired sufficient knowledge to fit him to engage in practice? Until it can be proved that the colleges fail, in whole or in part, to furnish the needed instruction, and that the faculties are either incapable or cannot be trusted to determine the fitness of their students for graduation, while the examining board possess both the ability and the integrity, the claim set up for the great need of such bodies to review and verify the work of the colleges must remain utterly unproved. The burden of proof is upon those who wish to maintain the supreme authority of these bodies, and indications seem to justify the belief that the profession, after having waited long, will soon *demand* the proof. Mere assertion, specious and shifty argument, seemingly plausible excuse, bluff and bluster, have all been tried and exhausted, and nothing will now avail but demonstration. The established and recognized institutions of learning must stand, and their certificates, subject, possibly, to some reasonable oversight, at the time or directly after they are granted, must be accepted, or else "the beginning of the end" will be in sight, and the colleges will soon fall, for it will become apparent that they have outlived their usefulness, and in their fall may be forecast the end of university training throughout the world. Is the picture formidable? It might be if there were any danger of its realization.

Again, certain provisions of dental laws conflict with some requirements of the code of ethics. Either the code must stand and the laws be made to accord that degree of recognition and toleration which it prescribes among members of the same profession, or it must be shown that dentistry is not amenable to the rules hitherto supposed to apply, and that the accepted idea of ethics has become obsolete and must be relegated to the realm of discarded antiquities, along with the colleges.

Can a sane man imagine that he, as an educated and reputable dentist, has fully discharged his duty toward his community when he gives his support to a law which might prove unfair to a more able man than himself, but which does not even inquire whether those engaged in practice are honest and reputable practitioners, or if they follow methods which, if adopted by attorneys, would secure their disbarment, or if pursued in medical practice would cause them to be classed with the voodoo doctors and abortionists?

A man who in early life has testified to a proper regard to his profession by entering it "through the door of a reputable and established college," and who has passed years in honorable, conscientious, and successful practice, has established a claim upon the profession at large which they should cheerfully recognize. Should the exigencies of life force him to seek a permanent or a temporary change of location, any law which imposes on him an examination which might embrace questions that only a college professor or a student fresh from examinations could answer, or which would authorize a prosecution—nay, a persecution—in case he should pass into an adjoining state to relieve the necessities of a patient unable to consult him at home, is not in keeping with the spirit of these days.

The profession stands to-day in a position of peculiar interest, for by the record of the present time you will be judged by posterity. The century which gave birth to modern dentistry, and which has witnessed in it a growth unprecedented in the history of all professions, draws rapidly to a close, and those who fill an active place in the profession now will occupy a conspicuous one when the history of the present shall have been written. It rests with you whether this century shall witness still one more triumph of dentistry, this time over the obstacles placed in its way by the advocates of pernicious legislation, or whether the closing years of its cycle of glory shall be darkened by a surrender to false doctrines, some roots of which derive nourishment from that most unworthy source called by the old Latin poet "the unhallowed thirst for gold."

Looking backward over the path up which our profession has made its wonderfully rapid ascent, we see the milestones along that highway, ornamented by the names of men who labored well and faithfully for the elevation of our calling, but among them is not even one name which proclaims its owner as a wise and great law-giver.

Consider this: look forward into the dawning twentieth century, and contemplate the advance which dentistry will make to the yet higher and broader plane which it is destined to occupy, and in that vision will be foreshadowed the place which will be accorded to you by the profession in the future. Shall your sons and grandsons remember you as wisely continuing and greatly enlarging the work inaugurated by those men of noble mind who first opened up the way through which dentistry advanced from a very humble position to one of great credit, or as leaving them a legacy of discord in the shape of laws more suited to the spirit of the Middle Ages than to the end of the nineteenth century? Your essayist is "filled with an abiding faith" that before the first sunrise of the coming century the honesty, the true professional spirit, and the sound common sense of our colleagues the world over, will have swept aside every clumsy and ill-advised measure calculated to retard our healthy growth, and dentistry will still be found in its accustomed place in the vanguard of the liberal professions, dispensing its blessings with an increased and ever-increasing bounty.

Dr. C. N. Peirce, Philadelphia, would dissent from much that was in the two papers. It is of very great importance that the students should have proper preliminary education, but when we attack the laws we are handling a difficult subject. We have now about forty dental colleges, and charters for perhaps as many more. In this the public see a condition which will depreciate the quality of the men graduated, for these colleges must depend upon the fees from the students for their existence, and they must practically say, "Come to our school, and we will see that you get your degree in the shortest time possible." Some of them practically promise a diploma whether the student gets the education or not. This makes the necessity ot the dental laws.

He had long been closely connected with dental education, and favored dental laws which would require every one who wanted to enter the profession to pass an examination before a competent, impartial board of examiners. This is not generally the rule at present, but it is what we will come to. At the last meeting of the Pennsylvania State Dental Association, a resolution was offered by Dr. E. C. Kirk that the dental student should be placed in the same position as the medical student is in our state now,—that is, he should, after he has obtained his diploma, go before an examining board and be examined ; all the examinations to be written, and questions and answers to be placed on file at the capital of the state, so that if at any time it should be necessary they can be examined ; and if the students think they have been wronged, the wrong may be redressed. We intend to try for this, and believe it will be a law within the next five years.

This is the best way to raise the condition of the schools. His experience with schools for forty years had taught him that in a class of say two or three hundred students all will not be equally studious, and in such a class it is very likely some will be sharp enough to get through the school examination and get their degrees even if they have not qualified themselves by hard work during the term. On after-examination, under different conditions, they would not be able to pass, and we want to get men into the profession who will be so well prepared that they will not fear to go before any examining body.

Dr. B. H. Catching, Atlanta, thought that to do away with the examining boards would lessen the number of students at the colleges, and he did not think any examining board was so contemptible as to wish to keep men out of the profession in order to protect themselves from competition. No properly qualified graduate need fear, nor does he fear, the examinations of the boards. As far as his own knowledge goes, the questions are invariably fair and easy.

Dr. R. R. Freeman, Nashville, indorsed the views expressed in the papers and those of Dr. Peirce also. The needs of the people demand of dental students a good preliminary education, and if we can force the students to get this they will afterward be grateful to us for our action. To uphold our claim to being a liberal profession we must not only insist upon this, but should have some means to punish those who indulge in unprofessional conduct to increase their gains.

Dr. H. J. McKellops, St. Louis, said he was not proud of the dental colleges in the United States, nor of the dental laws either. We complain because England has refused to allow the holder of an American diploma to practice, and yet the different states are passing laws to the same effect. Is it good law ? Not a bit of it. What we want is a law to regulate the colleges and make them so thorough that their degrees will be good in any state or country.

Dr. B. B. Smith, Gainesville, Fla., thought the reason England had taken the step it has in excluding American dentists from practice was because the dentists from this country were generally considered the best in the world, and professional jealousy prompted the English practitioners to desire to exclude them.

On motion, the subject was laid over for further discussion till the evening session, and the association adjourned.

Evening Session.

The association was called to order at 8.30 P.M.; President Smith in the chair.

Dr. C. N. Peirce thought the dental profession was in a transition state, and the state boards as now constituted were part of the evolutionary process. They will be superseded by boards that will give a degree which will be recognized in every state in the Union.

Dr. W. C. Barrett, Buffalo, N. Y., said all were agreed as to the desirability of examining boards. The only question remaining was, What shall be their character? When we have a board that will command the respect of the whole profession, there will be no further trouble. In the state of New York the body known as the University of New York has charge of all the school interests of the state. This body does no teaching, but is a confederation of all the higher educational bodies in the state, and its board of regents are representatives of these bodies. They are nineteen in number, all elected for life, and serve without compensation. They must necessarily be, and always have been, men of the highest educational status, and have all power in granting and revoking charters of all educational institutions. The board of regents does not educate, but exercises supervisory functions. It has a system of regents' examinations which it holds in the different educational institutions, and it has never been charged that there could be anything unfair in these examinations. This system establishes standards of education which are unvarying and unbending.

The regents are now taking the professional educational institutions under their charge, and every student must pass the examination of the regents before he can matriculate. The deans of the colleges cannot control in this matter; they are not allowed to matriculate any student without this examination, and after graduation from the college the students must go before the board of regents and pass an examination before being allowed to practice. It is only within the last year that they have extended their control over the dental schools, and the preliminary examination to which the dental students are subjected is in nearly all branches the same as that for medical students. No dean can matriculate a student without the regents' certificate, though there is a little leeway given here, inasmuch as they are allowed a little time in which to get this certificate. Under these circumstances a school in the state of New York must walk very straight or it will lose its charter. They have all been warned.

Does this place the schools of the state of New York at a great disadvantage? It might, under some circumstances. A student who could not pass the regents' examination could go out of the state and be matriculated, but he could never practice within the state, as the regents would never recognize his degree unless it came from an institution governed by the same rules.

The regents' examinations are carried on by boards which they appoint, and these examinations are, and always have been, above suspicion. We ought to rejoice at this condition of things, for it elevates us to what we have always desired to be, a profession. It establishes a standard which cannot be lowered. Under this plan the schools only educate, they do not license to practice.

Dr. Frank Abbott, New York, said there were a few more points in regard to the control of the regents over educational matters which would perhaps interest the association. The University of New York consists of representatives from all schools under its care, and if they feel disposed they may read papers at its meetings and discuss questions. Every school under the regents' care must report to the regents everything it does. A graduate of any reputable dental college may go to the state of New York and send his diploma to one of the censors of the board of regents, and if the college is on his list he will be allowed to practice.

Dr. T. B. Welch, Vineland, N. J., said that when he graduated at a medical college in New York, forty-three years ago, a gentleman who had only been in the college four months, but who was a graduate of a regular scientific college and was well read up in medicine, applied for the regents' certificate, frankly stating the time he had spent at the medical college. The chairman told him they had nothing to do with where he got his education nor how long it took; they only cared to know that he had it, and their examination would satisfy them on that point.

Dr. McKellops said the injustice was that the minute a graduate goes through this examination and wants to practice in another state he would have to submit to a new examination before he could do so. This should be done away with.

Dr. W H. Morgan, Nashville, feared that such a body as described by Drs. Barrett and Abbott might not be above the influence of favor or sympathy.

Dr. J. Y. Crawford, Nashville, said that one important point in the composition of examining boards was that no member should be connected with any educational institution. The boards of examiners should pass upon the merits and the methods of the institutions, and when they are found to be up to proper standards their diplomas should give a man the privilege to practice in any state. He wants a law, and believes it will come, which will deprive a man guilty of unprofessional conduct of the right to practice.

Dr. Louis Ottofy, Chicago, was surprised that so many seemed to think a national law was possible. It is not. The only way is to make every effort to have the states pass the best laws possible, always aiming at uniformity.

On motion, the session adjourned.

The election of officers was held on Monday, August 6, and resulted as follows: H. E. Beach, Clarksville, Tenn., president; John R. Thompson, Atlanta, Ga., first vice-president; L. P. Dotterer, Charleston, S. C., second vice-president; R. D. Seals, Fort Smith, Ark., third vice-president; S. W. Foster, Decatur, Ala., recording secretary; E. P. Beadles, Danville, Va., corresponding secretary.

Atlanta was selected as the place for the next meeting, the time to be announced hereafter.

(To be continued.)

AMERICAN MEDICAL ASSOCIATION—SECTION ON ORAL AND DENTAL SURGERY.

(Continued from page 735.)

THIRD DAY.

THE section was called to order at 3 P.M.; Dr. Goddard in the chair.

In the absence of Dr. Talbot, who was in attendance on another section, Dr. J. D. Hodgen was elected temporary secretary.

Dr. J. D. Hodgen, San Francisco, read a paper entitled, "The Present and Future Status of the Dental Practitioner," of which an abstract follows:

From a survey of the duties of the dentist it is to be inferred that the truly proficient practitioner has at least a partial, if not a finished, medical education; that he is to no slight extent an oral surgeon, and that he is a skillful and scientific mechanic. He is thus at once a physician, a surgeon, and a handicraftsman.

While those who dispute the advantages of a medical education to the dentist are strong in numbers, they are weak in argument. It is perhaps true that many men who are now enabled to pursue a course in dentistry would be deprived of that privilege if our colleges prolonged their term of pupilage to the extent necessary to embody a medical curriculum; but only three years ago the course in dentistry was lengthened from two years to three, and by actual statistics there are more colleges and more students to-day than at any time previous. It is also said that dental practitioners burdened with medical education "view their dental work through medical spectacles." What detriment this may be to their judgment as dentists is not clearly explained. Further, it is argued that the majority of dentists who attain a medical education "subsequently abandon dentistry for the practice of medicine." Such a condition, of course, does not interest us nor fall within our province to consider.

The status of the dentist of to-day is pre-eminently that of change. He has reached that point at which he must declare himself a handicraftsman, a mechanic, a skilled laborer, or a scientific specialist of the great healing art. We must now decide whether we are to practice tooth-restoration or tooth-conservation; whether we are henceforth to be satisfied with the slaughter of natural organs and tissues in order to restore and supply, or by scientific investigation aim at the conservation of what remains and prevent the inroads of further destruction.

It has been lately remarked that dentists are "wonderful patchers up of things half gone, but they do not know how to prevent the going." Is the cause of this condition that our mechanical skill has been neglected? Should we have had more infirmary and laboratory practice and training at college? Is our metallurgy and physics defective? No; more science and more medical education. Conservative dentistry must necessarily be based on an appreciation of the anatomical, physiological, and pathological relations of the mouth in disease and health, and until the importance of this kind of knowledge is fully appreciated, a community will fail to receive at the hands of its dentists the benefit which they have a right to expect. A wider range of knowledge by the dentist is imperatively demanded.

The paper then sketched the formation of the section on Oral and Dental Surgery in the American Medical Association, quoting the resolution adopted by the association in 1887, which is as far as the recognition of dentistry as a medical specialty by medicine has gone. Since 1887 no particular advancement has been made, certainly on the part of medicine.

Medicine in its broadest sense is a science and theory of disease and of remedies, the art of preventing, curing, or alleviating diseases and lesions of the human body, and its highest form to-day is found in its specialism; in other words, the medical art breaks away at once from the unity of the theory of disease, and, while there is but one body of pathological doctrine for either sex, for every period of life, and for every region and part of the organism, the practical art divides itself into departments and subdepartments, such as surgery, obstetrics, dermatology, ophthalmology, otology, etc. Dentistry, or more properly at this juncture, odontology, being the science or art of preventing, curing, or alleviating the diseases of the teeth, which form an important part of the human body, is therefore a department of the healing art.

Why, then, are we still clamoring without the gates for admission? Because to the doctor of medicine this is not strictly true. He is not so liberal. Medicine to him is only medicine when the art of preventing, curing, or alleviating diseases of the human body is practiced by medical graduates of medical colleges. When teeth are conserved from disease or extracted when useless, it is dentistry.

So the status of dentistry to-day, as far as our medical brothers are concerned, is not that of a specialty of medicine, principally because we are not graduates in medicine.

The influences which keep us apart are: (1) The necessary amount of mechanics our profession is obliged to preach and practice; (2) the distinctive degree and curriculum we are attempting to maintain and enforce; (3) the percentage of our profession that are not graduates—many of whom, though, are our brightest lights; (4) our determination to be recognized.

The forces and influences which will eventually draw us beneath the maternal roof are: (1) The addition of medical chairs to dental faculties, and the division of dentistry into operative and mechanical; (2) the patent dissatisfaction in which the degree is held, and the disinclination to settle upon the not-universally adopted degree of Doctor of Dental Surgery, together with the tendency to establish a variety of post-graduate degrees for the purpose of advertising the doctorate and the college conferring it; (3) the rapid percentage decrease of the body of non-graduates, and the tendency of dental and medical graduates who intend to practice dentistry to acquire both medical and dental degrees ; (4) the establishment of the oral section of the American Medical Association.

The elevation of any particular class of men is, however, dependent upon a demand on the part of their constituents, the people.

The forces, then, of successful issue lie in the education of our patients, in the establishment of recognition from them occasioned by scientific efficiency, and an elevated qualification in the average practitioner. No amount of recognition from a national, state, or local medical association given to a body of men undeserving can be made to stand the test of popular opinion. Complete recognition can only result in the displacement of the dental degree by the medical for all, with special training for special practice.

Dr. R. H. Cool said that he was interested in the paper, especially in its advocacy of a wider range of knowledge for the dental practitioner. He took the opposite view, that more knowledge of oral and dental surgery and of its resources was needed by medical men. More and more the best surgeons and best physicians are coming to call upon the dentist in oral lesions. As an instance of the value of the dentist's knowledge in these cases, there is no known splint for a broken jaw like that made by an experienced dentist. In antral troubles the surgeon also calls in the aid of the dentist. With regard to instruments, those shown by Dr. Talbot for perforating the antrum produced the impression that they would give a great deal of pain, while our dental engine makes a better opening much easier. We can almost say that dentistry is now acknowledged among the leading surgeons as the source of dental information, and he thought we are being recognized as a professional body by them.

Dr. A. F. McLain, Santa Rosa, agreed with Dr. Cool as to the advantages of consultation between skilled surgeons and dentists in diseases of the mouth and jaws. A student at the dental college contributed to a successful result in a case in which there was a fracture of the jaw near the ramus, which may have been comminuted. This student took the case in charge, made an interdental splint for it, and the result was everything that it should be.

Dr. M. J. Sullivan, San Francisco, heartily indorsed the tone of the paper. He had always believed in a liberal medical education for the dentist. The better the foundation the surer the success, both theoretical and practical.

The subject was passed.

Dr. G. S. Dean, San Francisco, read a paper entitled "The Systemic Factor in the Treatment of Dental Caries." An abstract follows :

In choosing his subject, Dr. Dean said he had been guided first by a desire to avoid what he called his besetting sin, scientifically speaking,—an inclination to quarrel with authority. He had therefore sought what he might call a new subject,—that is, one on which, as far as he was aware, outside of an occasional hint of possibility, nothing has yet appeared in print. He hoped thus to appear, not as a critic, but as the supporter of a thesis,—the presenter of a basis for criticism by others. It seemed also an eminently proper subject to present on an occasion when the practitioner of general medicine and the practitioner of dentistry, who in the not distant past were sadly ignorant of one another's territory, have come together to see what they may do jointly for the welfare of mankind,—a subject which lies within the territory of both, the systemic side of the treatment of the commonest of dental diseases,—the commonest, in fact, of all the physical ills with which mankind is afflicted. He would endeavor to show that there is frequently—not always—a systemic factor in the etiology of dental caries, and that systemic treatment is often needed for the cure of this local affection. This being shown, it will appear that the disease has practical interest for the general as well as for the special practitioner.

He would introduce the subject by presenting a case, which he maintained at some length to be the proper way to introduce a new subject, because at the outset a single concrete presentation is worth a world of misty generalities. For the presentation of new truth vividly, convincingly, rendering it graspable and assimilable, there is nothing which can take the place of contact with the facts.

A gentleman sought dental examination occasionally during some years, his teeth being always found free from caries. At length, on the approximal faces of two of his teeth, cavities appeared. Examination of the saliva revealed nothing worthy of note, but while the patient was "well," there was perhaps a trifling gastric and certainly a slight intestinal indigestion, search for the cause of which proved futile, and such hygienic attention, general and local, was given as seemed possible in the absence of etiological insight. About a year later the filled teeth were in good condition, but three other interdental spaces in different parts of the mouth were bordered by decay. The general gastro-intestinal error, though not great, was noticeable; and it was accompanied by rather frequent attacks of diarrhea, serious in character, sometimes supervening on excretion, again without perceptible exciting cause. The patient looked paler and duller, and he said, though "well," he was "somewhat run down." There was no apparent structural error; the troubles were purely functional. There was systemic atony or asthenia and disorder of the intestinal tract, the latter being extended as distinguished from localized, and simple or apeptic as distinguished from complex or parapeptic. The relation between the local and the systemic derangement was beyond the writer's view.

The dental disease seemed incapable of actual remedy, capable only of retardation by persistent or repeated local attention. The progress of the destruction of the teeth was again checked by filling, and the patient was brought to an active resolve to care locally for his teeth by keeping them clean, in order to prevent the destruction by meeting the effects of the predisposition with local measures.

In a few weeks he reappeared, suffering from amygdalitis purulenta, —"quinsy,"—which terminated in suppuration. A more minute investigation of the man's aërial surroundings showed nothing. He had been living in and frequenting the same buildings during somewhat more than the period of his dental decay. The quinsy had appeared three or four days after his return home from a month's absence, and had apparently been contracted during his absence. The synchronism of his habitation of his present abode and the caries of his teeth seemed suspicious, but the house was apparently healthful, above suspicion, and the synchronism a mere chance coincidence. In a few months the patient reappeared, again suffering with quinsy. Holding to the belief, not as an unproved hypothesis but as a theory which he had established beyond reasonable doubt in a thesis published some years ago, that the excitant of purulent amygdalitis is always poison contained in the air inhaled, Dr. Dean then inquired again concerning the patient's exposure to poison-bearing air, but not the smallest light could be obtained from his answers. He had visited the country again, but not the same region as during his previous absence. The sole common antecedent to the two attacks of tonsillar inflammation was a return home after an absence of some weeks. The quinsy-poison was then in the house which the man had inhabited for years. That he had had no quinsy during these years was explicable by the fact that while at home his rooms were always well ventilated; during his absence they were tightly closed, and on both occasions he had returned at night and had slept on the (infected) pillows in the confined air of a month.

Marked differences in the condition of the patient under the two attacks,—bright, feeling well, hungry, under the last, and sick, dull, drooping, without appetite, under the first,—and in his recovery,—"well," when the pus escaped in the last, indisposed in the first for weeks,—were easily referable to the fact that the first was endured at home, the last away from home after remaining one day, as this was the only circumstantial difference.

The problem was solved. The etiology of the dental caries was at once transparent. The man had slept in a quinsy house. The foul air of his domicile was the cause of his atonic condition, which in turn produced his long-continued digestive indisposition. The step to the causation of the dental caries was easy. Dr. Dean then rehearsed the various theories as to the office of the saliva, from which he drew the conclusion that the fact of the dependence of dental caries on the state or character of the saliva must be universally admitted; from which it follows that any state of the system in which the oral digestion is impaired predisposes to dental caries. Since the prostration of the patient impaired the gastro-intestinal digestion, it seemed reasonable that it impaired also the oral digestion, giving rise to saliva deficient in caries-preventing power.

The patient's domicile was removed at once, and the results to him during the three years he remained under Dr. Dean's eye fully justified the change. He improved in "tone"; the general digestive difficulty ceased to be noticeable; and what is of special interest in the present connection was the improvement in the oral digestion. Though the patient became comparatively lax in the local hygienic care of his teeth, he ceased to suffer from dental caries.

Subsequent inquiry developed the facts that while the unhealthy house was prepossessing, with large rooms, plenty of sunlight, and good ventilation, green or rot-inviting lumber appeared to have been used in its construction. The rooms of our patient, a handsome suite in the second story, without apparent connection with any sewer, were directly over a room and cellar in which usually provisions and sometimes articles not free from decomposition were kept, with sufficient communication to allow air to pass; were always "close" and "smelled badly" after being shut up for a time. The quinsy then was readily accounted for; a month's concentration gave a large stock of putrefactive germs. The prostration was probably due to some gaseous accompaniment of the poison which produced the purulent amygdalitis. It may possibly have been something having no connection with this, as, for example, a leak of illuminating gas ; but this is highly improbable.

Proceeding to generalities, Dr. Dean stated that dental caries is not usually idiopathic. If the salivary function (which is directly dependent on the general or systemic condition) is normal, the teeth, however frail, are safe from caries, and the strongest teeth will under adverse systemic conditions succumb to decay. Generally cavities of decay on the morsal aspect of a denture are not to be considered as of systemic origin, though to this there are numerous exceptions, as rapid decay on any aspect of a denture is to be regarded as due to systemic disturbance. Generally, again, it may be said (the exceptions are rare) that decay on the approximal or buccal aspects of the teeth is symptomatic or of systemic origin, and calls for something more than local treatment.

To be more explicit :

1. Dental caries is commonly due to fermentation of food, and occurs only where food lodges or remains for a sufficient length of time to undergo fermentation. Exposed or smooth surfaces of teeth where food cannot lodge are always free from caries.

2. Normal saliva prevents dental caries, either by preventing decay-producing fermentation or by overcoming the effects of this fermentation.

3. Anatomical (*i.e.*, macroscopic) faults of teeth (such as pits and fissures) and errors of location (such as overlapping) are sometimes so great as to lead to decay in spite of normal saliva.

4. "Frailty," or histological defect of the dental tissues, rarely, if ever, produces idiopathic dental caries.

5. Decay-producing error of saliva is undoubtedly sometimes idiopathic.

6. Idiopathic dental caries is relatively rare. The presumption is, therefore, always that the disease is secondary or symptomatic.

7. Beyond symptomatic dental caries, using the term in its strictest sense, there is usually, after removal of the ultimate cause, some further decay of the teeth—what may not improperly be called residual decay. It had appeared, in cases wherein the writer had been able to fix accurately the date of the removal of the fundamental cause, that there was a period of some months, possibly a year or more, wherein dental caries continued to appear, though with diminished severity. The disease seemed to subside, as a rule gradually, not instantaneously.

Having discriminated between idiopathic and symptomatic dental caries, it remains to ask on what other diseases or on what fundamental causes the symptomatic dental disease depends. Primarily, symptomatic dental caries is, plainly, due to disorders of the oral digestion. We find that dental caries seems to spring from the most diverse causes,—from almost anything, in fact, which appears likely to diminish the vigor of the ultimate cells or to drain or enfeeble any portion of the organism. This statement, vague as it is, presents nearly all our present knowledge on the subject of the fundamental etiology of the disease. Only a little definiteness may be given to the statement of causation. In male subjects, not suffering from any evident organic defect, lack of good air and exercise seems the first subject of suspicion, the most probable cause ; secondarily in these subjects the nitrogenous diet seems a fairly probable cause. In young men, irregularity of life, sexual excesses particularly, should be first suspected, it being a common, if not the most probable, cause of dental caries. In female subjects, between puberty and the menopause, we are amply warranted in first suspecting that the cause of our dental disease is a generative trouble.

But, having said all this, we who are practicing dentistry must confess ignorance on the one hand, and inability to act satisfactorily on the other. We cannot yet say with certainty that any given general cause will always produce, or that any given pathological condition will be always accompanied by, caries of the teeth. We are able sometimes to see through a case of dental caries almost at a glance, and are able occasionally to point with ease the way to positive cure ; but the cases wherein the cause is obscure outnumber those wherein it is easily discernible. In the diagnosis of the fundamental difficulty in cases like this, we who are practicing dentistry usually need assistance, as also in its removal, when perceptible ; must practically refer the patient to some one else. Hitherto, owing to inattention on the part of the general practitioner to the matter which forms the subject of this paper, the reference has been made by the dentist with comparative infrequency, and when made has not always received attention. In the future it is to be hoped that it will be made more frequently, and that it will meet with a more general and more thorough response. The actual cure of dental caries we are as a rule unable to effect alone. We need the aid of those who are practicing in the general field. The aim of this paper has been to show that this aid can be frequently effective, and the paper closes with an appeal for the assistance which will accomplish the end,—an appeal like that of the man in the vision to the Apostle : "Come over into Macedonia and help us."

Dr. Dunbar considered the etiology of caries of the teeth difficult to discuss, and he was quite ready to accept the views of the essay as to systemic influences as a general cause of decay. Original defective development of the tooth Dr. Dean touched upon as one of the principal predisposing causes of decay. There is no question that it is an acid in some form mysteriously supplied which causes the first breach, and people moving into malarial districts and residents in malarial districts are subject to many conditions which result in loss of teeth.

Many years ago he heard a prominent dentist, who lived in a miasmatic district, declare that he could not save pulps when they were once diseased. So, also, the references to quinsy-poisoning in the paper are certainly verified in this malarial environment. There is no question that we are on the right track for the discovery of the mysterious acid which makes the first breach in sound teeth and opens the way for decay. We are on the verge of an important discovery to add to and supplement those of Miller of Berlin.

Dr. Dean presented two teeth for inspection, and asked an expression of opinion as to whether the trouble with them was decay or erosion. He gave the following history : The teeth were of course baby teeth. The child during its second summer was very much troubled with digestive difficulties,—it is not fashionable to think there is any connection between such difficulties at this time and teething. The four central incisors above and below were present, but no other teeth. The upper ones presented on the points, when erupted, what he thought was caries. Now he wanted to know what it was. The cavities approached the pulp so close that filling could not be attempted. The four cuspids presented some appearance of erupting. He lanced over the two which were nearest to eruption, but it did not check the diarrhea. Then he cut for the others, and within twenty-four hours the digestive difficulty improved, and within a week the child had entirely recovered.

Dr. L. A. Teague, San Francisco, asked Dr. Dean why lancing was resorted to.

Dr. Dean replied that his belief was that the digestive difficulties were due to nervous reflex by pressure of the gum on the advancing tooth, that pressure being of course reflected on the papilla underneath. He lanced for the purpose of relieving the tension.

Dr. Talbot had had it in mind to write the same sort of a paper as this of Dr. Dean's for five or six years. We are indebted to Miller for the establishment of the relation of bacteria to the causes of caries, but we have got to go outside of dental practice to find the causes of decay. He did not think the writer of the paper meant to say that the poisonous air in the home of the patient acted directly, but that it produced a neurosis which caused the decay. Neuroses, eruptive fevers, cause maldevelopment of the teeth and bones. It is a fact that these troubles are due to lack of tonicity in the nervous system, as is nicely demonstrated in the case of the pregnant female, whose loss of teeth is due not to a lack of lime-salts in her food, but to the lack of tonicity in her nervous system which prevents their proper assimilation. It is to this cause we have to look for many of the troubles which we as dentists are called on to combat.

Dr. Dunbar said that it was often remarked that we as a race are going to lose our teeth,—that we Americans are more prone to diseases of the teeth than other nations. Those who make these assertions cite old country districts, and say they don't have these things there. It has been said that the cause of the difference is our American environment, our climate, the mixture of races, etc. They forget, in enumerating the causes of the state of affairs they describe, the circumstances under which our forefathers took up their residence here. Almost universally they had plenty of hard work to do, and they raised large families, for which the mothers did all the work. Was it not possible that a broken-down mother might transmit to the tenth or the twelfth child, especially if it was a female, her own exhausted nervous system, and that that is, in some cases at least, the secret of the "poor American teeth"? Then our American haste, our constant rush for money, makes us nervous, and we can't transmit, under such circumstances, an unimpaired nervous system to our children. On the other side they are more contented with their lot; here we are dissatisfied with our income and always trying to increase it. We are a neurotic people, and we are begetting neurotic children. More of the difficulties against which we have to contend are due to this cause than is generally understood.

Dr. A. C. Hart, San Francisco, said that his father had good teeth, his mother poor ones. His father had but one lateral incisor, the speaker had none; but his other teeth were like his father's in form and quality. His brother had teeth like those of the mother, of poor structure, and decay progressed among them in the same way as in hers. His preceptor taught him if decay was found on one side of the mouth to look for it in the same teeth on the other side; but while this is a good rule, it does not hold in all cases. He was puzzled to account for many things, and had to refer them to a principle which he called life-force. For instance, why is it that there are only boys born in one family and why all girls in another? He had reached the conclusion that when the man is stronger the child is apt to be a boy; when the woman is stronger the child is generally a girl. Whichever of the parents is stronger makes the impression on the embryo which determines its sex. There are many things in which if we change the environments we change the results.

Dr. Talbot wished to say a word upon two points referred to by Drs. Dunbar and Hart. Dr. Dunbar said there was more decay and more deformity of the teeth here than in Europe. If you take the class of people in Europe who can be fairly compared with the people here, their teeth do decay as much as here, and deformities are more prevalent and more marked there, especially among the aristocracy, than here. He had just read a paper before the neurological section of the association on this subject. The Spanish people have the most difficulty from neuroses, which do produce deformities among the aristocracy of Europe. Dr. Hart brought up the point of heredity, but it was not quite fair to give a conclusion on one case only. The tenth child may be the best of all. Heredity works both ways.

Dr. Lundborg, San Francisco, differed from Dr. Talbot as to the condition of the teeth of the aristocracy of Europe, especially as to the part where he came from, Sweden, as he was sure they had good teeth.

Dr. Talbot asked if they did not have a great deal of decay and many deformities.

Dr. Lundborg said that this was not more frequent than here. There is no nation in Europe where the teeth are not in a most excellent condition, both in the aristocracy and the mediocracy. This is attributable to their mode of living. Their food is not so generous as here. The caries and defective teeth of Europe may be traced to gestation. Good teeth may be found among people who live luxuriously, if the mothers take exercise and live on nourishing food. He did not think it could be fairly said that the people of Europe have as bad teeth as the people have here.

Dr. Dean referred to a question he had asked as to abscess unconnected with the gingival margin. He understood Dr. Younger to say that there was always some opening to or connection with the margin. He would like to ask if any one had seen a calculus unconnected with the gingival margin.

[Receiving no reply, Dr. Dean said that he had specimens which seemed to be of that nature.]

The subject was passed.

Dr. F. O. Jacobs, Oakland, read a paper on "Persistent Vitality," of which an abstract follows:

The question, Is there such a thing as persistent vitality? involves the broad problem as to what are the conditions which produce death, and what conditions are required to support life. Can we lay down rules which will hold good in all cases? While we find, in general, that living organisms may exist only in an atmosphere or medium containing more or less free oxygen, certain forms of life can exist in an atmosphere of carbonic acid, drawing their oxygen from their food. One form must have a medium of salt water; another fresh water; others still cannot be immersed in water even for a few moments without suffering death. Some organisms are able to withstand extreme changes of moisture or temperature. Some animal forms, and also plants; may be deprived entirely of their moisture, completely dried up, so that vital functions are entirely suspended until moisture is again restored. Some may be frozen in cakes of ice, or raised to a temperature near the boiling-point of water, without any other effect than to suspend functional activity for the time being.

Among the more highly specialized organisms the amputation of a member or organ generally produces death in the parts so treated, or in the entire organism, owing to which organ or part is separated from the body. But in the more simple forms amputation of a part only produces a new animal.

Why should the cutting of an animal in pieces only have the effect of multiplication, and simply depriving it of moisture produce death? The explanation is probably this: Its structure is that of large, delicate cells, very soft, which are easily broken up by desiccation, so that by depriving it of moisture its structure is destroyed, death resulting. Cutting it in pieces only multiplies it because it is composed of but one tissue throughout, capable of performing the same functions.

There are other plants and animals which, if deprived of their moisture, simply remain inactive until the proper quantity of moisture is restored, when they resume their normal functions. In their case the cell-structure is a strong, firm tissue, which is not broken up by desiccation. Depriving the living matter or protoplasm within of its moisture, is not a chemical but a physical change. The living matter within the cells is a chemical compound, the exact chemical nature of which is not known, though its constituents are. It is extremely unstable; being constantly acted upon by free oxygen on the one hand, it must be constantly taking up the proper material on the other to preserve the equilibrium in its chemical nature. Its affinity for water is great, and its activity depends upon the presence of water; the more water it is able to absorb, the more active it becomes. In the absence of that element activity ceases until moisture is restored, unless some chemical change takes place, when it is no longer protoplasm, as it does not form compounds with other substances without losing its identity. A living tissue is never attached to a dead one or to other substances differing in chemical nature from itself. Hence, when a living tissue is found attached to another, supposed to be dead, it must be considered evidence that the tissue supposed to be dead is possessed of at least a low degree of vitality.

What has been said of protoplasm is true of it wherever found, for living matter is the same thing wherever found. The differences in apparent effects upon it are due to differences in the structure of the tissue it inhabits.

If a tissue can be transplanted from one place or location to another, some time must elapse between the two operations. It then becomes a question how long will a tissue endure between the two operations, and what tissues are most favorable to such operations? How long can the scrapings of epithelial cells be preserved before transplanting, or how much time might elapse between the operation of extracting and transplanting a tooth? The evidence furnished by such operations is conclusive that it is much greater than any of us have supposed.

The structure of a tooth is not changed by extracting, and decomposition is less likely to set in than in any other tissue of the body. The facts that have been referred to show that death implies a chemical change, and without that there is no death; and that the tissues best suited to transplanting, replanting, etc., are hard, firm, and simple-structured tissues, like the skin, the teeth, and bone. The success that has been met with in transplanting such tissues fully confirms the above conclusion.

Dr. Younger was glad that so able a microscopist as Dr. Jacobs could substantiate opinions which he had held and advocated for years. Although they were at first denied, they are now, he believed, being looked upon with more favor. Dr. Barrett has confessed that he is a convert; Professor Wyeth and Professor Leconte have expressed their belief in persistent vitality; and now we have Dr. Jacobs, who was formerly opposed to the idea, testifying to its truth. He has stated the doctrine better than the speaker could. He told Professor Garretson, when he questioned the practicability of the operation, that implantation was a success, and that he would have to acknowledge it some time or other.

Dr. Dunbar said that, like many others, he was waiting for more definite proofs on the point, though he thought Dr. Younger was entitled to credit for the manner in which he had stood up for this theory.

Dr. Jacobs said that the subject had not been sufficiently discussed for him to say much in reply. What he intended to show was that living matter, no matter in what form it is found, acts the same under similar conditions. If a bone or a tooth persists longer than muscle, it is because of the difference in structure. He had attempted to show by plants and other animal tissues that where they withstood desiccation it was because of their strong cell-structure. The resurrection plant may be laid away for years, for an indefinite period, and then if supplied with moisture it begins to grow. This is not because of a difference in its protoplasm, but because of its structure. It has been simply dormant; there has been no change in its living matter. Because the living matter in a tooth is found in a little thread protected by strong walls, it has not much chance of being injured by destructive changes; consequently why should it not be restored when placed where it can be nourished?

Dr. Younger. One of the best proofs of persistent vitality is the return of sensibility to an implanted tooth, even after it has been a long while out of the mouth.

Dr. Dunbar asked Dr. Younger if his confidence in persistent vitality was such that he would leave a desiccated pulp in place in a tooth he intended to implant.

Dr. Younger said that he removed the pulp, as a rule, because he was not sure there was not some dead tissue in it; but the fibrillæ of the pulp in the dentinal canaliculi are left, and that is where the vitality may be reawakened.

Dr. Talbot spoke of a case reported by him which appeared to proceed on the same plan which Dr. Younger has demonstrated. It had already gone the rounds of the journals without a satisfactory explanation having been offered. It seemed to substantiate Dr. Younger's idea.

Dr. W. L. Cavell, San Francisco, related the case of a patient, now a lad of sixteen years, who about two years ago, while playing at school, had the two superior centrals knocked out. The teeth were replanted on the following day by a dentist, with the ordinary antiseptic precautions, but the apical foramina were not closed, being left in their natural condition. During the speaker's senior term at college, this same patient was given to him to be treated for a cleft palate, when a medium-sized cavity was found on the mesial surface, midway between cutting-edge and cervix, of the left central.

In preparing the cavity, he opened into the pulp-chamber, which it was supposed had been filled. A hemorrhage sufficient to fill the cavity and allow a drop of blood to fall upon the dam followed the opening into the chamber by the bur. After assuaging the hemorrhage, he capped the tissue in the ordinary way and inserted a gold filling. The tissue in the pulp-chamber was found on examination to be highly vascular, sensitive to the touch, but thermal changes caused no inconvenience. The tooth was not sensitive either to the bur or on the application of ice. The edges of the cavity were zigzag.

Dr. Dunbar had given it as his opinion that in the case of all replanted teeth there is an effort on the part of nature to remove the replanted tissue; that he believed that ultimately all these teeth would be exfoliated with absorbed roots; and he had expressed the opinion that in those cases which were accounted successful probably one-half or more of the root was absorbed and the place of the absorbed structure filled with hypertrophied tissue. But he did not think that any harm was done by the treatment. Dr. Talbot's case was a very remarkable one. He had been interested in a paper by Dr. Henry S. Chase, many years ago, on dental circulation. It would be interesting to know just where the exchange of pabulum took place in this case. He had taken the view that a tooth is doubly nourished,—from the pulp and from the pericementum. All dentists who have had experience in replantation or transplantation know that the tooth changes color in forty-eight hours, which is due to the moisture which it absorbs, as there is no circulation of blood in the tooth. He recalled the case of a butcher who broke a bicuspid, in which the tubuli were injected; they were clearly colored by the hematin of the blood. Although there is no circulation of blood in the tooth there is a movement of the blood-plasma from the foramen and the pericementum, and by osmosis there is an interchange between the two, and he had a theory that the interchange took place in the interglobular layer. He had had no demonstration of this, but it was a plausible explanation. With reference to Dr. Talbot's case, he could not see how a dead tooth would be affected in the way described, though in a case of immediate extirpation of the pulp it could readily occur; but that is contradicted by the fact that in all the cases of implantation he had had, the pericementum was dissolved away, and on percussion there was an absence of the springiness characteristic of normal teeth. If the pericementum is gone, where does the tooth get nourishment from?

Dr. Younger. The tooth referred to by Dr. Jacobs in the report printed in the DENTAL COSMOS for February, 1893, split, and when another suitable tooth was procured to take its place the attempt was made to extract it whole; but an implanted tooth is very difficult of extraction, as any one who has tried it will testify, and this one pulled apart. Dr. Jacobs, upon examining it under the microscope, said that it had true pericemental tissue clinging to it.

Dr. Jacobs said that he had expected to read his paper yesterday, and at that time had sections from these specimens, which he would bring to-morrow. He agreed with Dr. Dunbar in his statement that there is no true circulation of the blood in teeth, except as he said, where the apex is not so thoroughly calcified, but the circulation there is exactly the same as in plants. It is always up, never down. Osmotic action proceeds from above and below. In the absorption of implanted teeth, he held that the process was occasioned by lack of nourishment. Such a tooth has no pulp, from which the principal part of its nourishment comes, and when the pulp is gone not enough pabulum is received to keep the tooth in health.

The subject was passed.

Dr. Talbot read a request for the members of the section to assemble with the other delegates to-morrow at one o'clock in front of the mint, to have a photograph taken.

Adjourned till Friday at 2.30 P.M.

(To be continued.)

MIDWINTER FAIR DENTAL CONGRESS.

(Continued from page 745.)

SECOND DAY—*Evening Session.*

THE congress was called to order by Vice-President De Crow.

A paper by Dr. E. A. Lundy, Hong Kong, China, entitled "Conservation of Interdental Space," was read by the secretary.

The paper deprecated the unnecessary and useless extractions sometimes resorted to and the carelessness with which artificial substitutes are frequently fitted in such cases, causing a breaking down of the gingival margins, the absorption of the process, and ultimately the loss of the adjoining teeth. The effect of the removal of the first tooth from a denture is similar to that of taking away the keystone of an arch. The other teeth sooner or later change their positions, allowing food to crowd in and force away a portion of the gum. It is rarely now necessary to remove a root, but in the placing of gold crowns we should be careful that they fill the space so as to knuckle to their neighbors on either side. Fillings should be contoured, even if it does take more time, in order to preserve the gingival margin intact. The writer also considers that indiscriminate wedging is often fatal to the dental matrix, preferring the method of quick separation, when it is necessary to gain space.

Dr. F. W. Bliss, Santa Cruz, Cal., considered the subject one of interest to every dentist, for the preservation of the teeth requires the conservation of the interdental spaces. If they are enlarged by the extraction of teeth or by the ravages of decay, the greatest usefulness of the denture is not possible, and its function is greatly impaired. The loss of even one tooth affects the articulation of the entire set, and the evil is most serious if the articulation was perfect in the first instance. As Dr. Lundy says, the best way is to restore the defects either by contour fillings or bridges, according to the nature of the case.

A paper by Dr. C. E. Francis, of New York, entitled "Practical Suggestions," was read by Dr. R. W. Meek, of Oakland.

The paper deprecated the influence of extremists and dogmatists upon the young men, as exemplified in the common case where the professor in a dental college teaches his class as the only proper method one particular line of procedure, while perhaps a clinical lecturer before the same class demonstrates methods and states principles quite at variance with the teachings of the professor, cautioning the students against adopting the erroneous ideas of those who see things in a different light. And so on many subjects exactly diverse views are presented by different ultra would-be leaders, bidding us to go to one extreme or the other in all cases, instead of advising the consideration of the circumstances surrounding each individual case, and their treatment in the light of reason and according to sound, unbiased judgment.

The chief duty connected with the dentist's practice is to preserve human teeth. Taking cases as they come, he must do his best to arrest the mischief which circumstances do not usually permit his having the opportunity to attempt to prevent. This means that all decayed or decalcified portions of tooth-structure must be removed and the cavities filled with some suitable material that will protect them from further injury. Every faithful practitioner may be considered to thoroughly understand the manner of preparation of cavities, and to desire to make good, substantial fillings. Unquestionably the best fillings are those which most thoroughly seal and preserve the cavities. To this adaptability and solidity are the principal objects to be sought. Many dentists seem to imagine solidity the main feature to be attained, but in the judgment of the writer adaptability was not of less importance. It has been well said that "good judgment" is an essential material in the preparation of the cavities. Many fillings fail because of lack of adaptability to the particular case in hand of the material selected.

It is not difficult in slight cavities on the surfaces of densely formed or well-calcified teeth, at points easily kept clean, to introduce fillings which may be counted on for permanence. In fairly large cavities on approximal surfaces of teeth not well calcified, the task is more difficult; soft, pliable stoppings which can be securely packed against the walls without danger to their delicate margins, and which will neither contract nor expand, are needed. These conditions limit us to choose between soft gold and tin foil. For extreme cases, tin foil may be counted on as the safest and most reliable, because of its ready adaptation to the walls. The writer then referred to two new forms of this metal recently shown by Dr. E. T. Darby, thin shavings of pure block tin, which are easily manipulated and possess a decided cohesive property without any show of rigidity, and a foil made of refined tin by Mr. E. Kearsing, which also possesses to a considerable degree the much desired cohesive property. Either can be readily consolidated with ordinary pluggers by hand-pressure or mallet. The fillings can be built or extended to any desired contour, and when well condensed their surfaces are sufficiently hard to receive a smooth and brilliant polish.

To render the best possible service, we must take a broad view; be elastic in practice, culling from the best sources, choosing that which is best fitted for each individual case. Then by careful investigation, closely studying cause and effect and watching results, our work will give greater satisfaction to our patients and ourselves.

Dr. W. E. Burkhart, Tacoma, Wash., read a paper entitled "The Extent of Recuperation in Dental Tissues."

Dr. Burkhart summarized his paper in five conclusions:

1. Enamel has no recuperative power, and all loss of tissue must be restored artificially.

Whatever our theory of caries in detail, we know that all destructive agents proceed from the external surface of the tooth. The enamel is the hardest of all animal tissues, evidently evolved as an armor to protect the less defensive tissues within. Originally highly organic, it is so heavily loaded by the deposition of the inorganic elements that it has no ability to recover from injury, being entirely composed of inorganic elements so far as nervous impressions are concerned, and therefore lacking the first principle of recovery.

2. Dentine has no recuperative power so far as the restoration of lost tissue is concerned, but does possess such from a defensive point of view, and softened tissue may recalcify.

Dentine is very hard and ivory-like, but less dense than enamel, the interstices of the tubuli being filled with a material somewhat resembling protoplasm, which, in the absence of nerves, must be regarded as conveying impressions to the pulp, since dentine, not sensitive on exposure in excavating, becomes so if the cavity be left open a few days. In dentine diseased, but still possessing a considerable degree of vitality, there is often recovery following the insertion of a filling, through the defensive action of the pulp, though missing portions of dentine are not restored.

3. Pulps have recuperative power; but,

4. The tendency of all pulps is toward extermination.

The pulp is one of the most highly organized tissues in the whole economy, and within whose realm reaction is most decided and prompt. Immediately following irritation to this organ it makes a call for more blood, which produces inflammation; the blood-vessels become engorged, causing odontalgia by pressure against the confining walls. This condition usually recovers very well apparently, under anodynes and sedatives, the permanency of the result depending upon the length of time the disease has run and the individual recuperative power of the patient. Why, then, do dentists as a rule finally give up pulp-capping generally, only performing the operation in exceptionably favorable cases? The tendency of pulps is toward extermination, as is shown by their course of development: first all pulp, then gradually as calcification proceeds growing smaller, until at maturity they occupy a comparatively limited portion, with apparently no other function than assisting in recuperation in case of disease or accident. This, however, is of sufficient value to warrant their saving whenever that can be done.

5. The peridental membrane and contiguous tissue have remarkably strong recuperative power.

Inflamed and ulcerating surfaces of these tissues subside rapidly after the removal of the irritant, many times without further treatment. The writer believes, however, that the explanation of the apparent revival of vitality, and sometimes of sensation, in the peridental membrane in implanted teeth is explainable in the same way as the action of the sponge-graft—it forms a matrix for the deposit of new material, the matrix being finally carried away atom by atom. Even the dentinal tubuli or the uncalcified portion of the cementum may be penetrated by living matter capable of transmitting sensation. In alveolar abscess, the tendency of the surrounding tissue to recovery is well known.

Dr. S. J. Barber, Portland, Oregon, experienced a great deal of hesitation in criticising anything from the pen of our friend from Tacoma. He agrees with the statement in the paper as to enamel being without power of recuperation or defense, and to his mind the same argument applies to dentine. We have to go back to the pulp to account for the force that prevents the spread of the mischief. We find in a cavity which has been excavated in dentine for filling, if left open for a few days, a sensitiveness which was not there at first, and he takes that to be a warning that the territory has been invaded and protoplasm is being thrown out to repel the invader. He thinks that if we were to take out a large filling which we had inserted only a few days previously, we should find this same condition; and he believes that this explains why the fillings, which at first are slightly sensitive, get comfortable after a few days. In his opinion, it is the pulp which is responsible; it is throwing out its defenses. It is its work, and the dentine has nothing to do with it.

A paper by Dr. J. Foster Flagg, of Philadelphia, entitled "Composite Fillings," was read by Dr. Walter F. Lewis, of Oakland.

Dr. Flagg's paper referred to the early observance (during the '30's) of a relativity in ability to prevent recurrence of decay among recognized materials for filling teeth, even then tin foil making a better record than gold. From this it traced the gradual development of the composite and combination fillings of to-day, including the lining of cavities with one material and the insertion of a filling of another over the lining, and the combination of two materials, as by the rolling of tin and gold foils together. Having early suggested the lining of cavities in very soft teeth with zinc chlorid, which should be promptly covered with fillings of gold or amalgam, he had enlarged this line of work for nearly twenty years, and he has hundreds of composite fillings which have done service for from ten to twenty years in cavities in which gold had conspicuously failed.

During the later '70's, zinc phosphate, by which term he means oxid of zinc treated with nitric acid, and which he avers is sometimes erroneously called oxyphosphate, was introduced. Its legitimate uses are the lining of cavities, the filling of a large part of large cavities (with pulps protected in vital teeth), the strengthening of frail walls, the maintenance of color, the improvement of color in discolored teeth, the attachment of crowns and bridge-work, the securing of irregularity appliances, and the making of combination fillings and combination guards, when indicated, in the treatment of periodontitis. As a filling-material it is unreliable, sometimes lasting in a remarkable manner, at other times failing signally and summarily.

Of composite fillings, made by folding tin and gold together, he had little experience. Of those made by the introduction of tin foil at the cervical edge, followed by gold for the greater portion of the filling, he had supervised and directed the application certainly in thousands of cases, and the results have been decidedly gratifying. The "composite" and "combined" use of amalgam and gold, in all their varied applications, has made a record in the alleviation of trouble well worthy of recognition.

The "combination" work of zinc phosphate and amalgam has now eleven years of record upon which to base the opinion that it is the most reliable advance ever made in the saving of teeth below medium in structure. Dr. Flagg is careful never to place zinc phosphate where it can possibly endanger the pulp, using in such places as an intermediate "temporary stopping." The most satisfactory method is to first place upon the slab the required quantity of fluid and powder, then make a soft mix of amalgam (contour two parts, facing one part), and holding this in the palm of the hand by three fingers, make the zinc phosphate mix, introduce it into the cavity, pressing it against the walls; then taking a portion of the amalgam, it is placed in the center of the zinc phosphate, and with it the zinc phosphate is gently worked out to thin edges at the edge of the cavity; more amalgam is then added, and the combined materials are worked out to feather-edges in such wise that the zinc phosphate forms an adherent perfect lining and the amalgam a *combined* perfect covering.

Dr. L. Van Orden, San Francisco, thought when he first heard the title of the paper we were going to have the old question reopened, with gold on one side and amalgam on the other, but he was gratified that the subject was a more interesting and profitable one. The practice advocated in the paper is one which is likely to be increasingly comfortable. He did not understand why Dr. Flagg dwells so lightly on the combination of amalgam and gold. For many large fillings the placing of a little amalgam at the cervical margin is an excellent plan. He is not so familiar with the use of tin and gold in combination, and he has some question as to whether there would be any disintegration of the tin under the gold. As to the lining of cavities, he has found Gilbert's "temporary stopping" very satisfactory in that regard. He had not made use of the combination of cement and amalgam, but would do so on Dr. Flagg's recommendation. The most interesting combination that had come under his notice within the year was the use of cement as an anchorage for a gold filling in shallow cavities. It adds remarkable strength to the operation. The best preparation of gold for this work is the new mat gold. It is placed over the cement while this is yet soft, and pressed to place with smooth-faced pluggers or burnishers. If slight retainers are made, those who try it will be thoroughly satisfied with the results. The effects of thermal changes are reduced to the minimum.

Another combination is offered as a reply to one of the questions submitted for discussion in the local societies by the American Dental Association, as to what materials should enter into a temporary stopping to last a minimum period of three years. He thought that this was rather a long term for a temporary filling, as he had always been taught that a temporary filling should not be expected to last more than six months. It had occurred to him, however, in a case in which the cavity extended below the gum-margin, near the pulp, to use gutta-percha in the portion nearest the pulp, so as to guard against devitalizing it, and fill over that with amalgam. If at any time the tooth so filled should become refractory, running a fissure bur through the amalgam will allow it to be picked out readily, and a hot instrument will attend to the gutta-percha. He thought it likely this combination would meet the needs of the case for three years.

Dr. Van Orden would like some time to say something of gold as a filling-material on its merits ; that is, the relative merits of gold and the plastics, as he hoped to take a little broader view of the question than is shown in the ordinary presentation of it. He is of the opinion that the work of Dr. Flagg will be appreciated better in the future than it has been in the past. He was satisfied that the clientele of a dentist in Philadelphia was entirely different from that of the dentist in San Francisco. He had worked for patients who had been in the hands of Dr. Flagg since childhood, and he was satisfied that had it not been for this previous experience he could not have retained them for a year, no matter how conscientiously he labored for them. If any are inclined to question Dr. Flagg's position now, he believed the time would come when his place would be one of the most enviable among dentists.

Dr. Geo. H. Chance, Portland, Oregon, wanted to state for the benefit of his Nevada brethren that he was a bimetallist. There is a great deal of food for thought in the matters presented by Dr. Flagg. He was convinced that as men grew older they became more and more inclined to be bimetallists. When they are young they like to see pretty fillings, and they make them of gold only ; but as they become older they get more conservative, and use what is best for the case in hand. As to combination fillings, what do we as dentists want? We want to comfort the patient, to restore function to the teeth. When any of his patients are going away from home and ask him whom to go to in case they need the services of a dentist, he tells them if they go to a dentist who says amalgam is better than gold to let him put it in : if he is a poor gold-worker, he had better use amalgam ; if he is a good gold operator, he will not put in amalgam unless it is needed. If there was as much poor and slovenly work done with gold as with amalgam, there would be more failures with the gold than there are with the amalgam. Dr. Chance then told the story of the discovery of the cohesive property of gold. A dentist had ordered a book of gold, and the friend who sent it to save postage, which was quite an item in those days, took the leaves out of the book, and they came to the dentist all stuck together. He sent for another book, with directions to mail it just as it came from the manufacturer. This, of course, came all right, but the dentist, in reflecting over the incident, wondered why, if the gold leaves stuck together as in the first book, they would not do so when pressed together with an instrument in a cavity. He tried the experiment, it succeeded, and from this came the manufacture of cohesive foil.

Most of you have noticed in filling cavities with gold that they sometimes leak at the margins. In such cases the best thing to patch the defect with is amalgam. It makes one of the best combinations you can put in. It forms a peculiar union with the gold ; the amalgam does not disintegrate, does not penetrate the gold to any extent, nor does it grow very black. Polish the surface, and it is all right. As to the use of oxyphosphates, he finds nothing nicer for the front teeth of children.

Dr. Barber would like to know something more about one point which was barely touched upon in the paper, and he would be glad to hear the experience of some one who had used tin and gold, not in separate parts of the cavity, but rolled together. He had done some work of this kind, and he would like to know the experience of others. He has used it for five years, and it is highly satisfactory. He had experimented with it upon his own little people because he had them under his eyes all the time. He has three boys with these combination fillings, which are lasting well. In only one case had there been oxidation. The other day he cut into this filling, and to his surprise he found it crystallized instead of laminated, the change having occurred during the three or four years it had been in the mouth. Dr. Barber has also used tin in patching gold fillings where decay had recurred at the cervical margins, and the practice had been highly satisfactory. Nearly two years ago he had a conversation with the late Dr. Allport during a visit from that gentleman, and his experience had been similarly satisfactory. Dr. Allport mentioned one patient who had forty fillings of this sort in his mouth, and he claimed for them less liability to shock than with gold, better compatibility with the tooth-structure, and greater strength to resist the forces of mastication than tin alone would have.

Dr. Burkhart, who had seen the filling which Dr. Barber cut into, confirmed his statement as to its appearance. It looked just like broken steel, except that the crystals were larger.

Dr. J. G. Parsons, San Diego, Cal., very seldom combines two different metals in one filling, but he very frequently uses a metal with the phosphate cements. His method is to line the cavity with the cement and fill on that with gold or amalgam ; but he very seldom combines amalgam or tin with gold.

Dr. J. C. McCoy, Santa Ana, Cal., said that about eleven or twelve years ago the combination of tin and gold in fillings was a fad of his. At first he started the filling with tin and finished it with gold. He had met a gentleman here for whom he had made six or seven fillings in that way eleven years ago, and they are perfectly good to-day. He had not done much work in that way the last five years, though he did not know why. A few years since he had stopped working in that way,—putting in tin at the cervical margin and finishing with gold,—and had since done as Dr. Barber described, which is his practice to-day in the proper cases, and he coincides with Dr. Barber's opinion of the value of the method. He thinks it one of the best methods for children's teeth, and in fact in any position, and the filing is one of the easiest inserted. He had never tried the plan recommended by Dr. Flagg, of using amalgam and cement in combination, but he would do so on his return home.

Dr. A C. Hart, San Francisco, wanted to mention, in connection with Dr. Flagg's paper, a method of combining amalgam and gold in fillings, which in his hands was a great success, greater than if the tooth was filled entirely with gold ; that is, with the use of a matrix in large approximal cavities, say between a bicuspid and molar. He inserts a thin strip of German silver, fills the cavity, say one-eighth of an inch, with amalgam, and then removes the matrix and allows the patient to go, putting in the remainder of the filling with gold at another sitting, when retaining-pits can easily be made in the amalgam. This is much to be preferred to hammering in the gold at the same sitting, and so cause the amalgam to bulge out. He always covers the amalgam with gutta-percha in the mean time, and he also makes sure that the cavity is well filled at the cervical portion, as he polishes it carefully at the second sitting. The filling has the appearance of being made entirely of gold. He had tried the plan suggested by Dr. Van Orden, and it seemed as if the gutta-percha expanded, while the filling seemed to leak, and the patient complained of pain. He removed the gutta-percha, inserted oxyphosphate cement in its place, put in the amalgam, and there was no further trouble.

Dr. C. M. Carr, Salt Lake, Utah, had made a hobby of combination fillings for several years. One point which had not been touched upon he would like to say a word about, with reference to large approximal fillings in bicuspids and molars, extending to the grinding-surface, where the walls are frail. The gentleman who filled one-third of the cavity with amalgam and left two-thirds to be filled with gold did not go far enough with the amalgam. There is too much malleting required to do two-thirds of such a cavity with gold. His experience is that amalgam when it gives way does so on the grinding surface. It becomes too hard and brittle, and mastication breaks off a little particle here and there, and it becomes ragged. The best way in the kind of cavities referred to is to fill entirely with amalgam, and then cut around the margin with a fissure drill and fill with gold.

Dr. W. J. Prather, Fresno, Cal., had observed that the tendency among dentists was more and more to fill teeth with brains than with any single material,—the method which some of us relied upon in former days. This tendency was well exemplified by the discussions to-day. If there is not brains back of the operation there will be failure every time. Some dentists can make gold fillings which will last a lifetime ; others cannot do so, even in the best of teeth, and these had better fill with something else, or quit the business altogether.

Dr. W. G. A. Bonwill, Philadelphia, being called for, said that long ago, when Dr. Flagg first spoke of the compatibility of various filling-materials with tooth-structure, he had taken issue with him. And this leads to the observation, how few men are entitled to an opinion because of their knowledge of the subject, and how few whose opinions we ought to follow. So far as his own individual opinions are concerned, he has been an experimenter in many ways, and in this matter of "compatibility" is at complete variance with Dr Flagg. He (Dr. Bonwill) says "adaptability." He has used gold, tin, amalgam,—except copper amalgam, which is the most damnable material we ever had. Nothing ever exposed our ignorance and incompetency more than this one thing. You can save a tooth with anything, provided the cavity is properly prepared and the filling put in right. When we come to compatibility, you may take gold or put in a piece of porcelain, and there will be decay around it unless certain conditions are complied with. Combination fillings are not necessary. He believes in gold, but there are other things which are used which are better than gold in certain relations. He could fill a tooth with gold, packing it carefully, but if he allows any portion of it at the cervix to come in contact with the opposite tooth he cannot save it. The greatest trouble about filling at the cervix is that we don't go far enough in excavating ; we must go beyond the decay, and then if the filling is properly put in there need be no fear that it will not preserve the tooth. It does not hold true in his practice that he cannot save teeth if he fills with gold at the cervix. He uses gold and he uses amalgam, but he never uses tin. It will save teeth, but nothing but contour work will save many teeth in the condition in which they come to us to-day, and even if you make a perfect contour with tin it will not stand. If he has to use anything but gold, he takes amalgam ; but a great deal depends upon the way it is used. The proper way is to put it in under bibulous paper, and dry out the mercury, and this makes the filling impervious. It makes a difference whether the amalgam is filed or cut in shavings. The former won't amalgamate properly ; the latter makes a perfect mass. With a matrix on each side he presses the filling firmly with bibulous paper to absorb the mercury, and he thus saves teeth which many cut off and crown. In fifteen or twenty-five minutes large cavities may be filled, and any one can readily learn how to do it. He would not make a combination filling with the expectation of its proving better than one of amalgam or gold alone. He would fill the cavity entirely with amalgam, and then, perhaps, cut out a portion and fill with gold for appearance' sake. If you want to put gold in contact with amalgam, and will use an amalgam having seven per cent. of gold in it, the filling will not discolor, and it will preserve the tooth.

Dr. Charles, of Kansas, wished to say to the gentleman who inquired about the conditions which obtained in fillings of gold and tin rolled together, that he had had some experience in that direction some years since. He had also corresponded with Dr. Miller, of Portland, and some other of his friends, and they thought that the bond of union between the metals was a chemical combination. Since then he had experimented with this class of fillings, removing them after a year or two, and on examination the conclusion was reached that there was no chemical combination, but a mechanical union which produced a crystalline structure of both metals ; also, that in acid mouths the tin was gradually dissolved out, leaving the filling porous, but harder than the gold alone would have been.

Adjourned to 7.30 P.M.

Dr. Wilder's paper on "Orthodontia," referred to in the report last month, said that prior to 1868, although there had been attempts to correct irregularities for many years, the first reports appearing in 1820, there existed practically no source from which the student could readily obtain information upon subjects pertaining to oral deformities. Dr. Wilder sketched briefly the anatomy of the teeth, and with the aid of the stereopticon illustrated the different malformations, giving the causes commonly assigned to them. The movement of teeth in correcting these irregularities is based upon the anatomical fact that the teeth are placed upon the maxillæ surrounded by vascular, elastic, bony processes, which are easily moved, absorbed, and reproduced, the roots penetrating but little into the true maxillæ, and in their movement affecting it but slightly, if at all; and the physiological fact that bone will yield or become absorbed under certain influences, and also be reproduced.

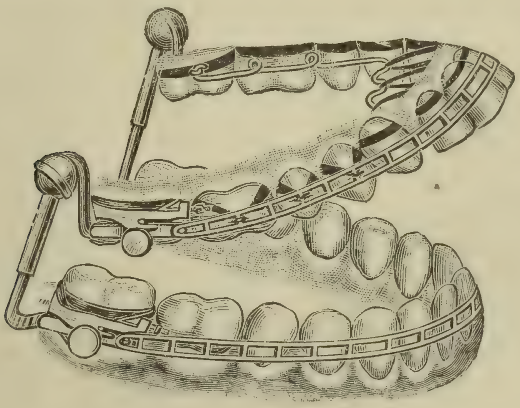
The enlargement of the arch can be accomplished with great rapidity and with perfect safety,—so rapidly, indeed, as to preclude the idea that the external walls of the process are broken down by absorption to permit it; and the only conclusion is that the vascularity of the alveoli permits an elasticity which allows the teeth to be moved outwardly, carrying the external process along with them. This process is not necessarily absorbed at any subsequent period simply because pressure has been brought against it. It has not been stretched beyond its powers of elasticity; no sequestrum has been formed, and it will remain the same process and continue to perform its functions until deposition of new bone shall have filled up to it and the whole become solid. Nevertheless, there must be a limit to the rapid movement of teeth outwardly, lest destruction of the process ensue.

While the treatment of irregularities is lifted above the plane of ordinary mechanics by reason of the vital organs which are affected, thus making it an important branch of mechanical surgery, it must be conceded that the operation is almost entirely mechanical, and the most skillful mechanic, aided by the most improved tools, will do the best work. To allege that there have not been good dentists or good work performed in the past would be ridiculous; but the barbarous tools and the heroic treatment which were forced upon them rendered good work the exception rather than the rule.

The paper then passed to a consideration of the various devices for regulating teeth which have been used, including the screw, the wedge, elastic bands, inclined planes, levers, ligatures, etc., the special usefulness of each of which was shown, together with the objections which experience had shown were inherent to them. Then followed a sketch of the systems of regulating known as the Patrick, Angle, Headridge-Coffin, the Farrar, Byrnes, and Talbot, and a brief reference to the method of "luxation" described by Dr. George Cunningham at the World's Columbian Congress, in which the virtues and the points in which these methods failed to reach the ideal were set forth.

Dr. Wilder concluded by a description, with stereopticon exhibit, of the apparatus he had invented, which, he said, represented the results of over twelve years of study and experiment. A perfect appliance must be simple, and have a direct tensile movement, with the slightest interference with speech and mastication, and it must be cleanly and stable. These were points which he claimed for his method, together with the following: In its use impressions and models are not only unnecessary, but absolutely useless, except for the purpose of demonstrating the change effected at the close of the operation. The probable effect of the change of position of the teeth can always be prognosticated by looking at them in the mouth. The teeth can be drawn closer to the regulator than with other devices, and both upper and lower teeth are regulated at the same time. The operator has complete control of the posterior teeth, preventing them from moving forward during an operation. Any irregularity can be easily corrected with this apparatus, which, being made of incorruptible material, is easily cleansed, and can be used for any number of cases.

The outer bands, constructed of spring gold, are divided in the middle and arranged with a suitable slide, so that the outer circle or band can be expanded or contracted, and fastened, making it capable of adjustment to any mouth. The posterior teeth are used for anchorage always, and both expansion and contraction can be accomplished. In expanding, to prevent these teeth from collapsing a gold spring wire is used around the palatal surfaces and connected to the anchored teeth. The ball-and-socket attachment gives greater resisting power where the anchorage is not sufficient, and by its use the posterior teeth can be locked, and the lower made to move the upper teeth, and *vice versa*, without interfering with the labial movements. Teeth can be moved upward or downward, backward or forward, outward or inward, or rotated without the use of bands; all the movements being produced with grass line or rubber tubing. The appliance is patented.



(To be continued.)

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

THE thirteenth annual meeting of the National Association of Dental Examiners was held at Old Point Comfort, Va., begining Tuesday, August 7, 1894; Dr. J. Searle Hurlbut presiding. In the absence of the secretary, Dr. C. A. Meeker was appointed secretary *pro tem.*

The following state boards were represented:

Alabama—T. P. Whitby.

Delaware—D. M. Hitch, C. R. Jefferis.

District of Columbia—H. B. Noble, Wms. Donnally.
Georgia—B. H. Catching.
Illinois—L. L. Davis.
Iowa—J. T. Abbott.
Kansas—L. C. Wasson.
Kentucky—C. G. Edwards.
Massachusetts—J. Searle Hurlbut.
New Jersey—F. C. Barlow, Chas. A. Meeker.
North Carolina—V. E. Turner.
Pennsylvania—W. E. Magill, Louis Jack, L. Ashley Faught.
Tennessee—J. Y. Crawford.
Virginia—J. Hall Moore, E. P. Beadles.

The secretary read a communication from the board of examiners of the state of Minnesota, insisting that their resignation, tendered in 1892, should be accepted. On motion of Dr. C. G. Edwards, the resignation was accepted.

An application for membership from the board of examiners of the state of Oregon was received, and the secretary instructed to answer the same.

On motion of Dr. F. C. Barlow, the secretary was instructed to have the constitution, by-laws, and standing resolutions to date printed in pamphlet form and sent to all members of the association.

On motion of Dr. Louis Jack, the secretary was instructed to have the proceedings of the association at its meetings of 1893–94 printed in one pamphlet.

The secretary read a memorial from the examining boards of New York, New Jersey, Delaware, Rhode Island, Connecticut, Pennsylvania, and the District of Columbia, regarding the necessity of uniformity in standards of examinations in different states, which with the following resolution on the same subject, laid over last year, was referred to a committee consisting of Drs. Faught, Crawford, and Catching:

> *Resolved*, That it is the sense of the National Association of Dental Examiners, that when a member of the dental profession presents a certificate of registration from a state board of dental examiners, duly created by law, that the same should entitle the holder of such certificate to registration without an additional examination in any state of the Union having a law to regulate the practice of dentistry. *Provided*, such certificate was obtained on examination.

The committee subsequently reported, recommending the adoption of the memorial as expressing the sense of the association.

The report was adopted, a verbal amendment to the memorial offered by Dr. Donnally being accepted, making it read as follows:

> TO THE NATIONAL ASSOCIATION OF DENTAL EXAMINERS:
>
> *Gentlemen*,—Delegates from the examining boards of New York, New Jersey, Delaware, Rhode Island, District of Columbia, Pennsylvania, and Connecticut, in conference assembled, respectfully offer for your consideration the opinion that ours is an advancing profession, our watchword is progress, and we ask that your influence shall be actively directed to secure thorough preliminary examinations in every dental college in every state.
>
> We think the true interests of our profession demand such uniformity in standards of examinations as can be obtained by state boards, always striving after higher and better attainments, and with a view to ultimately bring about a safe, judicious, and fair reception of certificates from state boards of other states.
>
> It is our opinion that it would be most desirable that a law whose provisions

should be uniform, yet whose phraseology might be different, so as to suit differences of environment in the various states, should be enacted in all the states. It is not practicable to have any such law enacted in all the states at once; but if such a law were enacted in half a dozen leading states, other states would gradually fall into line and adopt similar ones.

We are in favor of bringing responsibility for defective education as directly as possible upon the offending school, with a view to making every diploma real and reliable evidence as regards the holder's ability and proficiency. Therefore we will use our influence as practitioners, as well as members of examining boards, to obtain the selection, by competent authority, in each state, of an independent body, disconnected from the institutions which educate, with sole authority to grant licenses and admit to practice.

G. Carleton Brown, *Secretary.*

The Committee on Colleges reported that there are now twenty-eight recognized and fifteen unrecognized colleges; that there have been no additions to the accepted schools.

The chairman, Dr. Jack, read the following report of the numbers of matriculates and graduates at the different schools:

RECOGNIZED SCHOOLS.—1894.	Freshmen.	Juniors.	Seniors.	Graduates.	Post-Graduates.
1. Baltimore College of Dental Surgery, Md.	47	45	40	37	
2. Boston Dental College, Mass.	55	55	35	33	
3. Chicago College of Dental Surgery, Ill.	127	116	69	58	28
4. College of Dentistry, Department of Medicine, University of Minnesota	23	12	6	6	
5. Dental Department Columbian University, D. C.	12	19	8	8	1
6. Dental Department National University, D. C.	6	9	8	8	
7. Northwestern University Dental School, Ill.	33	36	25	24	6
8. Dental Department Southern Medical College, Ga.	19	4	4	4	
9. Dental Department University of Tennessee	16	12	12	10	
10. Dental Department Harvard University, Mass.	31	14	18	14	
11. Indiana Dental College, Ind.	29	32	23	23	
12. Kansas City Dental College, Mo.	54	36	18	16	
13. Louisville College of Dentistry, Ky.	54	27	10	9	
14. Missouri Dental College	41	31	21	21	
15. New York College of Dentistry	111	92	81	62	1
16. Northwestern College of Dental Surgery, Ill.	32	36	25	24	
17. Ohio College of Dental Surgery	57	57	34	34	
18. Pennsylvania College of Dental Surgery	100	80	63	62	
19. Philadelphia Dental College	93	107	78	77	
20. School of Dentistry of Meharry Medical Department of Central Tennessee College	4	3	3	3	
21. Dental Department University of California	68	45	18	18	
22. Dental Department University of Iowa	70	39	32	31	1
23. University of Maryland, Dental Department	58	54	36	34	2
24. University of Michigan, Dental Department	67	52	66	64	1
25. University of Pennsylvania, Dental Department	81	72	65	64	3
26. Vanderbilt University, Tenn.	55	44	25	25	
27. Western Dental College, Mo.	42	36	27	26	
28. American College of Dental Surgery, Ill.	128	71	51	44	77

* No report.

UNRECOGNIZED SCHOOLS.	Freshmen.	Juniors.	Seniors.	Graduates.	Post-Graduates.
University of Denver, Dental Department	9	4	3	3	
University of Buffalo, Dental Department	38	32	6	6	
Cincinnati College of Dental Surgery	5	3	5	5	
Atlanta Dental College	61	31	26	26	8
Howard University, Dental Department	6	6	5		
Dental Department Homœopathic Hospital College	12	7	4	4	
Western Reserve University, Dental Department	9	15	4	4	
Cincinnati College of Medicine and Surgery, Dental Department*					
Detroit College of Medicine, Department of Dentistry	16	21	1	1	
University College of Medicine, Department of Dentistry, Richmond, Va.*					
The New York Dental School*					
Birmingham Dental College, Alabama	17	7	3	3	
Marion Sims College of Médicine, Dental Department, St. Louis (first session, September 11, 1894)*					
Dental Department, Tennessee Medical College*					
United States Dental College, Chicago*					

* No report.

On motion of Dr. Meeker, the following was adopted :

Resolved, That any state board not represented by delegates at three successive meetings of this body should forfeit its membership.

On motion of Dr. Louis Jack, the following was adopted :

Resolved, That this body require the board of examiners in each state to become informed of the character of any school which may have been organized within its jurisdiction, and to have especial care in its scrutiny of any college which may have applied for admission to the National Association of Dental Faculties.

The following were elected officers for the ensuing year :

L. Ashley Faught, president ; J. T. Abbott, vice-president ; Chas. A. Meeker, secretary and treasurer.

After which the association adjourned to meet at the time and place appointed for the next annual meeting of the American Dental Association, this body to convene at 10 A.M. on the day preceding the date set for the meeting of the American Dental Association.

AMERICAN DENTAL SOCIETY OF EUROPE.

The American Dental Society of Europe held its nineteenth annual meeting at Geneva, Switzerland, August 6–8, 1894.

Great interest was manifested in a paper by Waldo E. Royce, D.D.S., of Tunbridge Wells, Eng., entitled "On the Etiology of Defective Enamel," which advanced the theory that the defects which Hutchinson attributes to hereditary syphilis may be properly ascribed to hereditary mercurialization, a theory which Dr. Royce has undertaken to test by experiments. Those relating to the effect of the *direct* action of mercury, upon litters of puppies two weeks old, were reported, the others being not yet advanced enough to present.

A paper by Prof. W. D. Miller, of Berlin, reported experiments to determine the relative adaptation of cohesive and non-cohesive gold to an irregular surface under low pressure. Most interesting lectures were given by two professors of the Geneva University,—Professor Eternod on the "Law of Statics in Hard and Soft Dental Tissues," which was demonstrated by the skulls of men and fish, and by ingenious apparatus, by microscopical specimens, and by drawings and models; and Professor Vulliet on "Dermoid Growths," illustrated by specimens taken from the abdomen and ovarian region.

There were also other papers, clinics, reports of cases in practice, so that although the meeting was not large, the interest was well sustained.

The following officers were elected for the year 1894–95: Dr. Chas. W. Jenkins, Zurich, president; Dr. Wm. Mitchell, London, vice-president; Dr. Chas. J. Monk, Wiesbaden, treasurer; Dr. Wm. S. Davenport, Paris, secretary.

The next annual meeting will be held August, 1895, in Boulogne, France.

Wm. S. Davenport, *Secretary.*

DENTAL SOCIETY ANNOUNCEMENTS.

UNION MEETING AT BUFFALO.

The annual union meeting of the Fifth, Sixth, Seventh, and Eighth District Dental Societies of the State of New York will be held in Buffalo, N. Y., October 30 and 31, 1894. A meeting of more than usual interest is expected.

D. H. Squire, *Secretary.*

NEW ENGLAND DENTAL SOCIETY.

The thirty-second annual meeting of the New England Dental Society will be held in Hotel Clarendon, Tremont street, Boston, Mass., Thursday and Friday, November 8 and 9, 1894, beginning Thursday afternoon at 1 o'clock. The meeting promises to be of unusual interest.

Edgar O. Kinsman, D.D.S., *Secretary,*
15 Brattle street, Cambridge, Mass.

EDITORIAL.

NITROUS OXID AND OXYGEN AS AN ANESTHETIC MIXTURE.

Quite early in the use of nitrous oxid for the production of anesthesia the suspicion arose that its physiological effect was, in part, if not wholly, due to oxygen starvation, or otherwise stated, that the anesthesia was an incidental concomitant of the asphyxia caused by replacing the oxygen in the blood by the respirable, non-irritant, and practically inert gas, nitrous oxid. This suspicion in many cases grew to be a fixed belief, and has by some been deemed a full and satisfactory explanation of the process of nitrous-oxid anesthesia. That such belief was not lacking in evidence to support it is fully shown by the literature of the subject. The clinical appearances of nitrous-oxid narcosis were scarcely distinguishable from those of simple asphyxia, whether mechanical or produced by the inhalation of other inert gases. Again, careful spectroscopic examinations made of the blood under nitrous-oxid narcosis have shown the absorption spectra of deoxidized hæmoglobin, indistinguishable in appearance from the absorption spectra of blood deoxidized by other means. The method of death and post-mortem appearances in fatal cases of nitrous-oxid administration have, in a majority of these instances, indicated that the asphyxial element was the principal, perhaps only, dangerous factor to be apprehended in the use of this agent. The unparalleled record of successful administrations of nitrous oxid has furnished ground for a solid faith in its safety, a conclusion which in view of the facts seems justifiable. But occasionally a death is reported under gas administration, and usually with symptoms which point to the asphyxial element as the cause of the fatality ; such fatalities occur rarely, but they demand recognition and investigation in order that they may be avoided. That deaths from nitrous-oxid administration are so extremely infrequent as to place the agent by common consent at the head of the list with respect to comparative harmlessness is no reason why the method of its administration should not be further improved until the danger factor is eliminated, if possible.

Dr. Hewitt clearly states the case in a recent communication, as follows : "But even if accidents and deaths occurred less frequently than is the case, even if there were but one recorded fatality from nitrous oxid as ordinarily given, I submit that it would still be our duty to attempt to find some safer method of administration, in order to minimize the already small risk, and reduce it, if possible, to *nil.*"

It is not our purpose to trace the successive steps which have been taken toward eliminating the asphyxial element in nitrous-oxid administration ; they have all been based upon the idea of combining with the gas either before or during its administration a certain or uncertain amount of air or oxygen. It is highly probable that in the ordinary administration of nitrous oxid the average operator admits from time to time small amounts of air, as he may deem it necessary for the safety of his patient, and to relieve profound stertor, jactitation, or deep cyanosis. This is, however, empirical, and dependence upon it as a routine method may be fraught with danger in certain cases, especially in inexperienced hands. This particular phase of the subject has been elaborated in recent numbers of the Dental Cosmos.

Efforts at a more precise and systematic method of combining nitrous oxid with oxygen or air for anesthetic purposes have been frequently made, but have only recently been so simplified as to render them practicable and easy of application to all cases. Among the most prominent experimenters in this direction was Professor Paul Bert, whose method involved a cumbersome apparatus which prohibited its general use. Recently the subject has acquired a more practical importance through the investigations and ingenuity of Dr. Frederick Hewitt, of London. Not the least interesting result of his investigations is the demonstration that nitrous oxid is a true anesthetic quite independently of its asphyxial factor, which is fully corroborative of the same observation made by Professor Bert. It has been clearly shown in papers by Dr. Hewitt* and by Dr. Thomas† that the zone of nitrous-oxid anesthesia, which is limited by consciousness on the one hand and by asphyxia on the other, is extremely narrow, but by the intelligent recognition of certain requisite conditions this zone may be practically utilized and a state of anesthesia be maintained in which all danger from asphyxia is eliminated.

In the *Journal of the British Dental Association* for June, 1894, Dr. Hewitt gives a detailed account of the perfected apparatus which he now employs for administering the mixed gases. The essential features of this apparatus are a gas-bag divided by a septum, which furnishes two compartments, one for oxygen and the other for nitrous oxid; a double flexible tube, which conveys the two gases separately to the inhaler through an ingeniously constructed valve in which the movement of a single lever permits the passage either of (*a*) air, (*b*) pure nitrous oxid, or (*c*) nitrous oxid mixed with any desired amount of oxygen. With an apparatus so arranged the progress of the anesthesia can be controlled with the utmost exactness and nicety, and continued for as long a time as may be needed for even many major operations.

Dr. Hewitt's method has gained wide acceptance in Europe, and possesses features which entitle it to careful study by American operators. We have recently had the opportunity of witnessing the production of anesthesia in a large number of cases by Hewitt's method at the hands of its author, and the advantages which it possesses over the ordinary practice of using pure nitrous oxid were clearly evident. The anesthesia produced was like a normal deep sleep, entirely free from stertor, jactitation, cyanosis, or any of the disagreeable, often repulsive, features so commonly incident to the use of undiluted nitrous oxid, and which should invariably be regarded as danger signals. To be able to thus avoid the one danger in the use of this important agent marks a decided advance, for, to quote the author of the method, "The presence of oxygen robs nitrous oxid of its one disadvantage and of its one risk."

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* Dental Cosmos, July, 1893.

† Ibid., June, 1893.

BIBLIOGRAPHICAL.

AIDE-MÉMOIRE DU CHIRURGIEN-DENTISTE. Par M. PAUL DUBOIS, Professeur à l'Ecole Dentaire de Paris, etc. Deuxième Partie. Affections Dentaires et Affections de la Cavité Buccale et des Maxillaires. Deuxième édition. Paris, 1894.

This work is what its name indicates, a handbook and aid to the memory, with respect to diseases of the oral cavity. The first part, which is published as a separate volume, includes the treatment of caries of different degrees and the procedures comprised under the title of operative dentistry. The field covered by the second volume is large, and as a consequence the treatment of a number of important topics is necessarily meager. One is somewhat disappointed to find the views upon the etiology of pyorrhea alveolaris, dental erosion, and salivary concretions somewhat antiquated, while the old errors with respect to pathological primary dentition are perpetuated. Gum-lancing is treated as gum-scarification, and the treatment of the purely hypothetical condition called gingival pruritus is formally discussed. The ancient error that the cicatricial tissue caused by healing of the gum divided by the lancet is more difficult of absorption than normal gum-tissue, is also duly set forth. Barring a few antiquities of this character, the book will serve the purpose indicated by its title,—viz, as an aid to the memory in its particular field.

CHEMISTRY: GENERAL, MEDICAL, AND PHARMACEUTICAL. INCLUDING THE CHEMISTRY OF THE UNITED STATES PHARMACOPŒIA. A Manual on the General Principles of the Science and their Applications in Medicine and Pharmacy. By JOHN ATTFIELD, F.R.S., Ph.D., Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain, etc. Fourteenth edition. Philadelphia: Lea Brothers & Co., 1894. Price, cloth, $2.75; leather, $3.25.

The present revised edition of this standard work is issued concurrently with an English edition, the fifteenth. The latter includes the chemistry of the British Pharmacopœia, as the present American edition similarly includes that of the United States Pharmacopœia.

The plan of Attfield's Chemistry has doubtless contributed as greatly to its popularity as a student's manual as its wonderful fulness of detail. The author has adopted as his motive the central idea that the science of chemistry can be illustrated and made plain to the student of medicine or pharmacy by the facts and phenomena included within the special field of their study. By developing this plan a harmonious relationship is maintained between the science and its practical application, which avoids confusion and enables the student to acquire a clear mental grasp of the subject.

The book is without a peer in its own field, and since its introduction in 1867 has exerted a marked influence not only upon methods of chemical instruction, but has furnished the precedent for improvements in chemical nomenclature and pharmaceutical methods which have been adopted in many subsequent writings, notably the Pharmacopœias of the United States and Great Britain. The present edition is much improved over its predecessor in that it has been brought up to the most recent advances, while much which has been superseded in the progress of the science has been eliminated from the text.

TRAITÉ TECHNIQUE DES PRÉPARATIONS MICROSCOPIQUES À L'USAGE DU DENTISTE. Par J. CHOQUET, Préparateur à l'Ecole Dentaire de Paris. Paris, Société d'Éditions Scientifiques, 1895.

This little book of 138 pages is a condensed and thoroughly practical guide in the histological study of the dental tissues. Besides the author's methods, it contains concise descriptions of the best methods of staining, cutting, and mounting sections as employed by leading workers in this department, and cannot fail to be a most valuable help to the student and worker in dental histology.

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OBITUARY.

DR. RANSOM WALKER.

DIED, at Owego, N. Y., July 31, 1894, of apoplexy, RANSOM WALKER, D.D.S., in the seventy-sixth year of his age.

Dr. Walker was born in Greene, Chenango county, N. Y., October 23, 1818. He received his early education in the public schools of his native town and at Cortland Academy, at Homer, N. Y. As he approached early manhood he felt impelled to enter the Christian ministry, and his subsequent education was along these lines; but later he abandoned that idea and entered upon the study of dentistry, being a pupil of the late Amos Westcott, of Syracuse. During the time of his pupilage the New York College of Dental Surgery was established in Syracuse, at which institution he attended one course of lectures, and the following year removed to Owego, where he began the practice of dentistry.

He very soon acquired a large and lucrative practice. During the winter of 1865-65 he left his practice to attend a course of lectures at the Pennsylvania College of Dental Surgery, from which he graduated in the spring of 1866. He then returned to Owego and resumed his professional work, which he pursued almost uninterruptedly until he was stricken while at his operating-chair, August 20, 1892. This was followed by another attack a few days later, which so disabled him that he was compelled to abandon his professional labors. Although he somewhat rallied from these attacks, and was able to keep about, he never regained the entire use of his hands. The final stroke came but a few days before his death.

Dr. Walker was a dentist of more than ordinary ability, possessing as he did manipulative skill in an eminent degree.

During the first twenty years of his practice he received into his office as pupils many young men, and he was regarded a faithful and conscientious preceptor. Among those who received their early training at his hands were O. E. Hill, of Brooklyn; Edwin T. Darby, of Philadelphia; Charles H. Darby, of St. Joseph, Mo.; and Frank B. Darby, of Elmira, N. Y.

Dr. Walker was among the first to improve the character of dental amalgams, and after years of experimentation he put upon the market, in 1866, an alloy composed of gold, platinum, silver, and tin, which was known as Walker's Excelsior Amalgam.

When a good man dies it is but fitting that we make mention of his worth, and Dr. Walker was a good man. He inherited from his ancestry a good constitution and a good name, but not riches; but by industry, honesty, and prudence he attained a competency.

The sense of justice was never more marked in any man than in him. His moral and religious character was above reproach. He was a true friend, a loving husband, a public-spirited citizen, a Christian gentleman.

As I pen these memorial lines of my departed preceptor and friend, I pause to hang upon his tombstone a garland rich in appreciation of kindness received at his hands.

Dr. Walker was married to Mary Snider, of Virgil, N. Y., September 3, 1845. She still survives him. EDWIN T. DARBY.

DR. CHARLES HENRY.

DIED, August 22, 1894, of cerebral hemorrhage, CHARLES HENRY, D.D.S., of Jacksonville, Ill., in the sixtieth year of his age.

Dr. Henry died suddenly on a railroad train, between St. Cloud and Sauk Center, while returning home with some friends from a pleasure trip to Osakis, Minn. He was born at Woodstock, Conn , August 20, 1835, where he lived until entering upon the study of dentistry at the Pennsylvania College of Dental Surgery, from which institution he graduated with the class of 1860. He immediately went south, and practiced at Savannah, Ga , until the outbreak of the Rebellion, at the close of which struggle he went west and practiced at Cedar Falls, Iowa. In the following year he removed to Jacksonville, Ill., where he has since resided as a successful practitioner and prominent citizen, having served his fellow-citizens in the official capacity of alderman with marked ability, and evincing much zeal in works of public charity and benevolence. He was a prominent Mason, and the ritual of that order was carried out at his burial.

While residing at Cedar Falls, Dr. Henry was married to Miss Martha M. Cole, who survives him, with four children, two of whom are Dr. Charles C. Henry, of Jacksonville, and Dr. George E. Henry, of Manitowoc, Wis.

DR. JOHN J. SMITH.

DIED, at Narragansett Pier, R. I., August 14, 1894, of peritonitis, JOHN J. SMITH, D.M.D., in the twenty-seventh year of his age.

Dr. Smith was born at Warren, R. I., December 2, 1867. He began the study of dentistry in September, 1890, at the dental department of Harvard University, and graduated therefrom with the class of 1893. After graduation he returned to Warren, and established himself in practice. His early death is much regretted.

HINTS, QUERIES, AND COMMENTS.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—On page 722 of the September number of your journal, while describing the filling of a tooth, I am reported as saying: "I took just fifty-five minutes, and six and a half books of gold were used." I never made such a statement. Please correct it. W. H. MORGAN.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—Dr. J. W. Eggleston, in his article on "Another Method of Gold Filling," says, "I am not one of those who claim to be able to fill the bottom of a cavity with non-cohesive and then finish with cohesive, and get cohesion between the two. I have often heard this claimed, but I cannot do it."

If he will use The S. S. White Co.'s Globe soft foil and J. M. Neys & Co.'s cohesive, I think he will find he can get thorough cohesion between these two makes of foil. I mention these two particular kinds for the reason that I know about them from daily practice, and for several years have used them almost exclusively, and do not know that the same results could be gotten with any other two kinds of soft and cohesive foils.

Very truly yours,

ELIZABETH CITY, N. C. J. HERBERT WHITE, D.D.S.

I HAVE thought of setting crowns with gum shellac. Would this prove to be satisfactory? What effect have the secretions on this substance? Information through COSMOS or private letter will be highly appreciated.—J. H. CROSSLAND, Montgomery, Ala.

HOW TO SOLDER PORCELAIN TEETH FOR BRIDGE- AND PLATE-WORK WITHOUT CRACKING THEM.—As the complaint that porcelain teeth cannot be soldered without cracking increases with the growing demand for bridgework, we are forced to the conclusion that the lesson of soldering has not been perfectly learned, or, if learned, has been forgotten or neglected.

It is hardly necessary to observe that the principal ingredient of porcelain teeth is feldspar, which is colored by metallic oxids, or that porcelain teeth are susceptible of being heated to incandescence before fusing.

The attachment for securing porcelain plate-teeth to their metallic backings is of platinum, which is the only metal capable of standing the extremely high heat necessary for fusing the porcelain while the teeth are being baked.

This platinum attachment generally consists of two or more headed round wire pins for each tooth, the headed ends of the pins being baked in the porcelain mass. To these pins is attached the metal backing, in which holes have been punched for the passage of the pins, which are then riveted upon the backing. Sometimes the free ends of the pins are simply bent over upon the backing, or are split and bent over to prevent the removal of the backing. The backing is then soldered to the pins to insure a firmer hold.

The soldering may be accomplished with or without investing the teeth. When no investment is employed, the teeth are placed in a row upon a flattened piece of charcoal. When the investment is employed, it should be composed of plaster of Paris and pewter sand (one-third in bulk of the latter), mixed with water into a paste, with which the porcelain is covered. The sand is used with the plaster because the latter is a poor absorbent of heat.

It is of importance to bear in mind that a tooth with its backing presents two materials which are differently affected by heat. First, there is the porcelain, which readily absorbs heat and holds it for a considerable length of time ; and, second, a metal which rapidly absorbs heat, but, unlike the porcelain, readily gives it off. For this reason, when heating the tooth and its backing, care must be taken to so distribute the heat that the porcelain receives its share, which should be distributed evenly throughout the mass, because the porcelain, being a friable material, will crack should it be unevenly heated. If the flame is directed upon the metal backing before the porcelain shows a red heat, the metal attachment-pins will conduct the heat to the center of the tooth before its opposite surface is heated sufficiently to prevent uneven expansion. This is particularly so when the porcelain surfaces of the teeth are covered with the investment of plaster of Paris, which is a very poor conductor of heat.

To invest a denture after the teeth have been arranged in proper alignment and occlusion, it should be placed upon a piece of charcoal and the entire surface of the porcelain covered with a mixture of plaster of Paris and pewter sand (which, as before stated, should consist of one-third in bulk of the sand), mixed as thick as can be manipulated. After this investment becomes hard and dry, thoroughly clean the metal surface to be soldered from all wax or other foreign substance which has been used in setting up the denture, which is now ready to be charged with solder.

Before applying the solder, the surfaces to be soldered should first be fluxed. To properly flux the metal, take a clean piece of slate or of glass, from one side of which the vitrified surface has been removed by grinding, and upon this slab grind a lump of borax with water until a creamy paste has been produced. Now, with a camel's-hair brush apply this paste so as to cover the surface of the backing to be soldered. The pellets of solder should also be coated all over with the paste. The solder may now be placed in position upon the backing, either before or after heating the teeth and investment, but in either case care should be taken to have the solder properly covered with the borax, as no solder will properly flow unless it has been suitably fluxed.

After the investment has been heated by placing the end of the charcoal having the investment thereon over a Bunsen burner and gradually heating it until all moisture is driven off, it is ready for the blow-pipe flame. This flame should at first be large enough to envelop the entire mass,—teeth, backing, and investment,—and should be so continued until the investment has been brought to a red heat. It is now safe to use a pointed or "wire" flame upon the solder for melting it. If care be taken to maintain the plaster investment at or near a red heat while flowing the solder, the teeth will not be broken, unless when arranging them care has not been taken to so space the teeth that they do not touch each other. In a bridge-piece it is of special importance that the teeth do not touch each other before soldering, as the approximate sides of the backing of the individual teeth have to be united with solder, which contracts in cooling. Suitable spacing of the teeth may readily be accomplished by placing a piece of thin paper between adjacent teeth when adjusting them for the bridge. This paper will be burned out in the process of soldering.—E. T. S.

How to Break and Crack Porcelain Teeth while Soldering Them.—Adjust the teeth on the bridge or denture so close together that they touch each other in spots. Heat up the investment hurriedly, and before it is thoroughly dry throw the flame upon the backing and try to melt the solder, especially when it is not covered with a wash of borax. Flux the parts to be soldered with *powdered* borax, so that a portion of the borax is scattered over the porcelain surface outside of the backing, in order that the heat will melt it over the porcelain portion of the tooth, and when it cools it will contract sufficiently to crack the enamel surface.—E. T. S.

Old Nitrous Oxid.—I recently obtained a cylinder of White's nitrous oxid from a dentist of this city who abandoned the use of gas in 1889. The shipping date on the cylinder was July 17, 1889. On weighing it, I found it contained forty gallons of gas. To test the gas, I filled a bag and took a few inhalations, and woke up on the floor with my dog licking my face and whining. I concluded that the gas was good, and have used all of it in the course of my practice. The date on the cylinder shows the gas to have been over five years old.

I have made inquiries at the dental depots and among dentists, but find no record of gas as old having been used.

These facts seemed to interest those to whom I related them, and I submit them for publication, hoping to bring out more information from any who may possess it.

The cylinder referred to had remained in a cellar during the whole five years. I noticed no difference between the action of the old gas and that recently purchased from the White Company. It certainly proves that gas can be kept indefinitely, and does not deteriorate in cylinders. No one with whom I conversed knew anything positive about it, and many were afraid to use such gas. I could see nothing to deter me from it, so I tried it myself, with the result as described. I shall be glad if some of the Cosmos readers can throw further light on the subject of aged gas.—C. J. Mapps, D.D.S., Brooklyn, N. Y.

Gallic Acid for Hemophilia.—Referring to the case of death from hemorrhage reported in the Dental Cosmos for August, p. 660, I beg leave to report the following case, and suggest that the internal use of gallic acid will prove valuable not only in hemophilia, but also in ordinary cases of stubborn hemorrhage, and that when necessary to operate for such cases the patient be prepared for the operation by a preliminary course of treatment of gallic acid. A point worthy of notice is that when the blood of the patient has become impregnated with the astringent, the effect is quite a long time in passing away.

Among my patients are two boys, brothers, who are both cases of hemophilia; they both have molar roots which have decayed below the gums, but they have avoided extraction for fear of hemorrhage. At times the gums become lacerated by the edges of the roots and bleed a great deal, sometimes for days. They have been accustomed to carry about with them a stick of nitrate of silver, and they cauterize the bleeding surfaces whenever necessary. This usually is sufficient. A short time ago one of the boys came to me to see if I could stop the bleeding, as the caustic had failed to do so. I think he said it had been bleeding more or less continuously for two weeks. Obviously a plug could not be used. I prescribed gallic acid in five-grain doses at intervals of two hours. By the time he had taken the third dose the hemorrhage ceased, and did not recur.—D. W. Barker, M.D.S., Brooklyn, N. Y.

Convenient Dentimeter.—Make a loop of common fine binding wire, and place the free ends into *an ordinary pin vise* which will grip it tightly; place the loop over root or crown to be measured, and twist the wire closely to obtain a correct measurement.—Frederick R. Sandusky, Shelbyville, Tenn.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING AUGUST, 1894.

August 7.—No. 524,156, to Otto B. Bachman. Thermo-electric volatilizing obtunder.
August 14.—No. 524,419, to Alfred E. Gray. Dental mouth-mirror.
August 21.—No. 524,798, to James H. Beebee. Dental vulcanizer.
August 28.—No. 525,166, to Edmund P. Stiles. Dental or surgical chair.
" "—No. 525,278, to Arthur E. Peck. Dental tool guard.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

THE TECHNIQUE OF NERVE-RESECTIONS FOR THE RELIEF OF PAIN ABOUT THE FACE AND JAWS.

BY M. H. CRYER, M.D., D.D.S., PHILADELPHIA, PA.

(Read before the Academy of Stomatology, Philadelphia, October 6, 1894.)

It gives me great pleasure to have the honor of presenting the first essay to this body for its consideration and discussion, the more so as the name of the society marks the recognition of a distinct evolutional advance in our professional relations. The intelligent practice of what has come to be considered as within the legitimate province of the dentist to-day includes so much more than the mere technique of dental operations, that a more comprehensive designation of the field is not only desirable, but necessary.

My gratification over the name Stomatology for this society is, I believe, shared by every one of you. The term, indeed, might have been chosen some time ago, as the dentist has long since outgrown the limitations of his original field, in which he devoted himself exclusively to the care and treatment of the teeth. In the pursuit of his calling he naturally became more familiar with the functions and relations of the mouth and its associate parts, until now he is fully equipped to deal with all complications connected with or dependent upon diseased conditions within his especial territory. And not only in his immediate department has this impress been made; many allied branches of science claim his devotion and intelligence. His trained mechanical ability has enabled him to produce the best microscopical sections of the different tissues connected with the mouth in all stages of their development. We are also proud to know that from our ranks have come the finest bacteriological studies of these regions that have been made. So brilliant has been the development of the bacterio-pathology of the mouth as compared with general bacterial pathology, that it presents the spectacle of a branch outgrowing the parent stem. We are shortly to celebrate the fiftieth anniversary of the application of anesthetics. This greatest of blessings to suffering humanity is due to the intelligence of Horace Wells, a dentist. In the mechanical department, the characteristic inventive spirit has been strongly manifested; instruments and methods are being constantly improved and new ones devised.

The activity which has characterized the development of our knowledge of oral science, as just noted, is seen in all its departments. Our knowledge of pathological conditions and their rational therapeusis has made rapid strides, until the great majority of morbid processes are fairly controllable by appropriate treatment. This general advance is as a natural consequence reflected in our educational methods, so that the equipment of the dentist of to-day is necessarily more thorough and satisfactory than was formerly possible. In view of these facts, it would seem to be quite within consistent limits to adopt the more comprehensive title by which this association is designated, a term which distinctively describes the broader sphere of activities which is by common consent the legitimate field occupied by the dental practitioner of the present. The department of oral surgery is one which, in my judgment, has occupied a somewhat anomalous position in the past. The operative measures for relief of pain about the face and jaws have been conducted almost exclusively by general surgeons. It will hardly be gainsaid, certainly not by this audience, that but few general surgeons have the training necessary for producing the special manipulative skill demanded for this work. I mean by this the kind of manual dexterity which is the acquirement of the properly trained dentist.

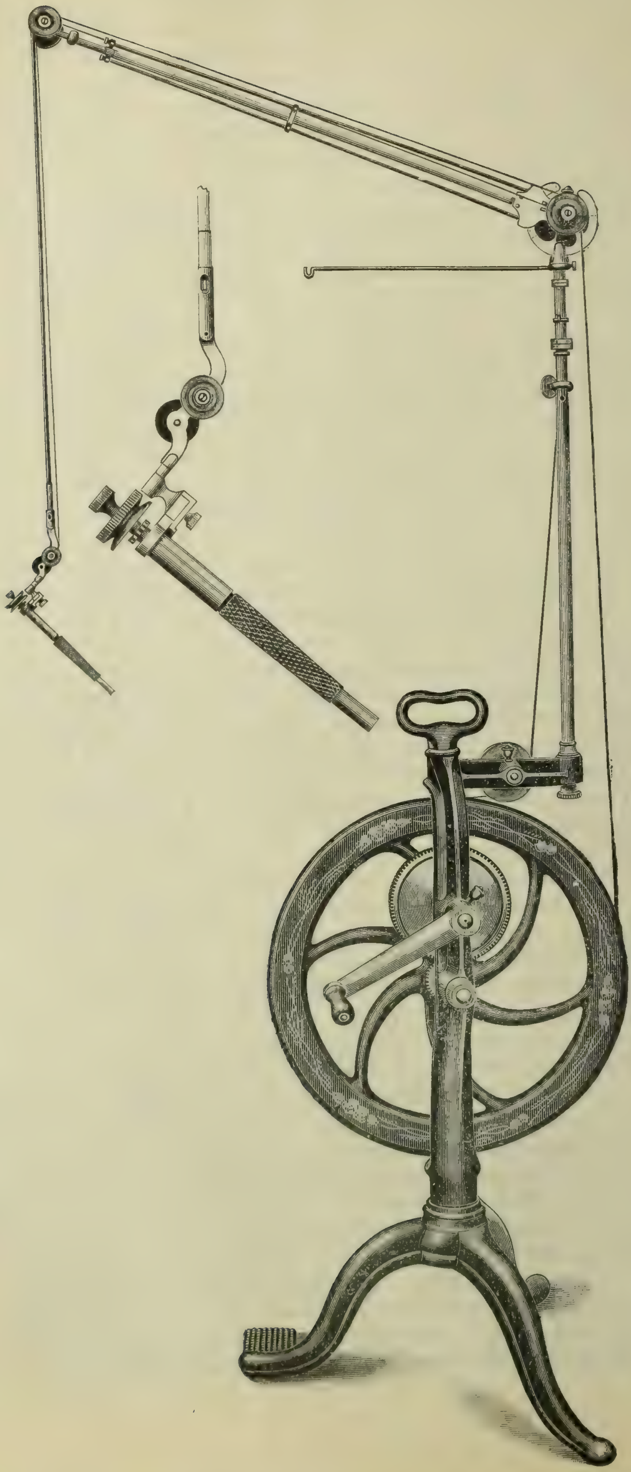
I should be lacking in historical accuracy, as well as in loyalty and due appreciation, were I to omit paying just tribute to the achievements in oral and general surgery of one who, beginning his training in the ranks of dentistry, has, by his natural abilities and special qualifications of heart and mind, won fame for himself and honor to his calling. It is the class of operations so closely identified with the life-work of Professor James E. Garretson that will form the basis of my communication this evening. The subject proper being the technique of these operations, we may dismiss all considerations of reasons which compel them.

It is assumed that a diagnosis has been made of a lesion affecting a nerve trunk or center; that we have excluded the possibility of the disorder having peripheral cause. We assume the existence of a lesion not peripheral, and will consider operations upon the great branches or trunks of the superior and inferior maxillary nerves. There is one problem which confronts the surgeon here, and that is the leaving of disfiguring cicatrices, a consideration which scarcely concerns those who operate upon parts of the body which are hidden. This necessitates, or makes advisable, that we operate with as small an external opening as possible, after selecting such place as will leave the least noticeable scar. Much of this work is done, therefore, in the dark, the sole dependence of the surgeon being his sense of touch, in connection with accurate or absolute anatomical knowledge. It will be seen from this that these operations require the most delicate skill, combined with a refined technique. The instrumental means prior to the past ten years, as, indeed, they are now with some, are found in tenotome knives, mallets, chisels, directors, scissors, and saws. A reference to Carnochan's work will give much of the history of these operations. Descriptions may be found in Gross's, Agnew's, or, better, in Garretson's Surgery. You are presumably familiar with Langenbeck's operation upon the infraorbital nerve. This consists in cutting the trunk just beyond the spheno-maxillary fissure, by a tenotome knife thrust in from the outer and lower margin of the orbit ; following this, an incision below the line of the orbit to the infraorbital foramen, where the severed nerve is caught and withdrawn. All other operations that I will describe, save this one, require bone-section ; for this there is no device approaching in completeness or effectiveness the improved surgical engine, with its perfected instruments, most of them evolutions of the dental engine burs. (See Figs. 1, 2.)

There are several operations for the resection of branches of these nerves, which are of superficial relation exclusively. As they are comparatively simple, we will proceed at once to consideration of the deep sections. There are two principal operations for the resection of the superior maxillary nerve ; one of these is in the posterior portion of the orbit, the other in front of and as near the round foramen as possible, this last involving the removal of Meckel's ganglion. The first operation is nicely accomplished by the following method, somewhat after Stoker : The eyelids should be closed by a single suture, and a curved incision made along the infraorbital ridge down to the bone ; then a vertical cut downward to the infraorbital foramen ; spreading the soft tissue, remove the periosteum from the bone covering the canal, and secure the nerve with a ligature ; then pass a dental pulp-canal plugger into the foramen over the nerve, as a director and guard, along the canal, until the point is in the orbit. By using a small engine bur the bone of the roof of the canal can be quickly cut down to the protecting plugger, when the nerve may be lifted from the canal intact. Now pass the nerve with the attached ligature through the opening of a neurotome, which must be worked backward as far as possible ; then, holding the nerve tightly, revolve the cutting portion, and the nerve will be severed close to the spheno-maxillary ganglion.

The second operation may be performed in two ways ; the first, and, to my mind, better one, is to make a trap-like opening exposing the greater portion of the anterior face of the superior maxillary bone ; find the foramen and secure the nerve as before ; then, with the engine, remove a portion of the face of the bone immediately below the foramen, thus opening the maxillary sinus. Control all hemorrhage as far as possible, and, again using the engine, open through the inner and superior portion of the posterior wall of the antrum, and enter the spheno-maxillary fossa, thus exposing the ganglion. By passing a long, delicate pulp-canal plugger below the nerve, as a means of protection from the engine bur, the bone of the floor of the canal may be cut away, using a long-shanked bur. Those unaccustomed to the use of the surgical engine could use in its stead a long, slender chisel, with one edge prolonged. This blade will pass along the floor of the canal and act as a guide, while the chisel will cut away the floor. After the floor of the canal has been removed, the plugger may be withdrawn and the nerve dropped into the antrum, and passed through the fenestrated opening of a neurotome large enough to include Meckel's ganglion ; pass the neurotome

FIG. 1.

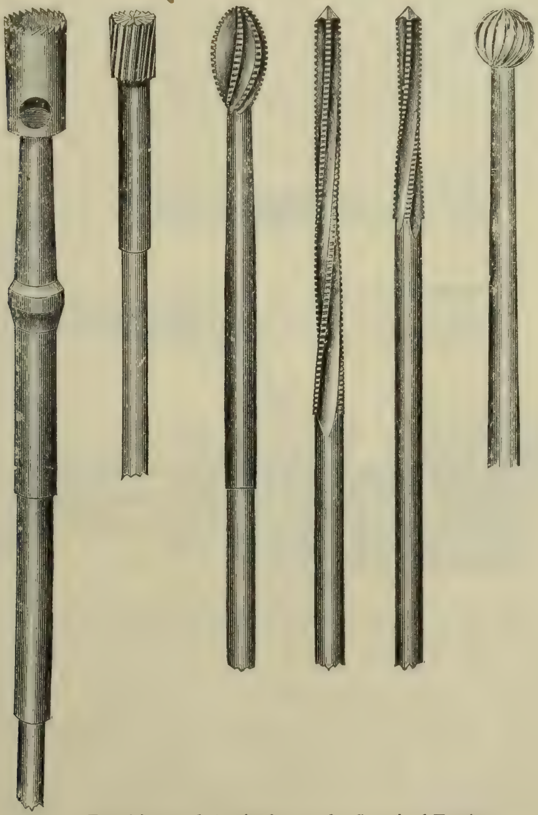


Improved Surgical Engine and Hand-piece.

backward to the round foramen, keeping the nerve tightly drawn, revolve the knife and divide the nerve ; then pull it away.

There are many operations for the resection of the branches of the inferior maxillary division ; but I shall take only those requiring bone-cutting, and of these only types. Professor Garretson's plan for the resection of the nerve within the inferior dental canal is as follows : An incision is made in the soft tissue of the chin under the jaw, in order that the resulting scar shall be hidden by the tissue under the border of the inferior maxilla. The line of incision then follows the border of the inferior maxilla. The tissues are now elevated so as to lift the cut upward in a line passing over the inferior dental canal. Holding the lips of the wound apart with retractors, the bony covering of the canal is next exposed and ready to be removed ; originally Hay's saw, a mallet, and a chisel were used in this operation. An improvement in this operation was in using the ordinary dental engine for cutting two parallel lines with a small circular saw, and uniting the two lines at each end by boring the bone with a bur or small trephine, thus completing the section. The strip of bone may then be lifted from its position, thus exposing the nerve. As the more powerful engine

FIG. 2.



Trephine and Typical Burs for Surgical Engine.

and specially adapted burs were introduced, this operation of uncovering the canal could be better and more quickly accomplished. After the bone is removed the nerve may be lifted from the canal and a section taken from it, after which the soft parts are closed by interrupted sutures: the wound soon heals, leaving a small scar in such a position that it does not show, except upon close observation. Professor Agnew's operation is to make a trap-like opening over the lower half of the ramus, remove a portion of bone by the use of a trephine, thus uncovering the canal, when a portion of the nerve may be removed.

These operations generally give relief for a brief period, but usually there is a recurrence of the pain. After resection, nature endeavors to replace the lost tissues by similar new growths, which take their place, and frequently the bony tissue of replacement encroaches within the canal to a greater or less extent. These new nerve-fibers are liable to become entangled in the new bone-formation; the pinching or pressure resulting from this may cause a recurrence of the neuralgia. At the present time it is regarded as more advisable to make the resection between the inferior dental canal and base of the skull; if the canal and nerve could be obliterated so that the latter could not again grow into the bone, I believe a permanent cure could be made in some cases. This might be prevented by sealing the inlet to the canal by a gold plug; but this might act as an irritant. It is possible, however, that a sterilized sponge packing might induce a secondary deposit which would obliterate the canal.

FIG. 3.

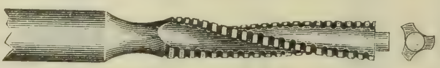


FIG. 4.

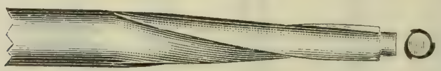
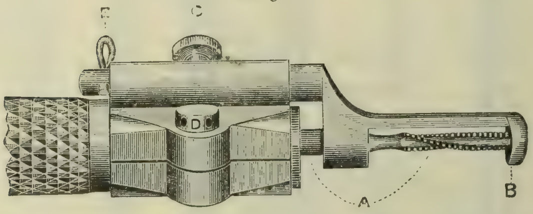


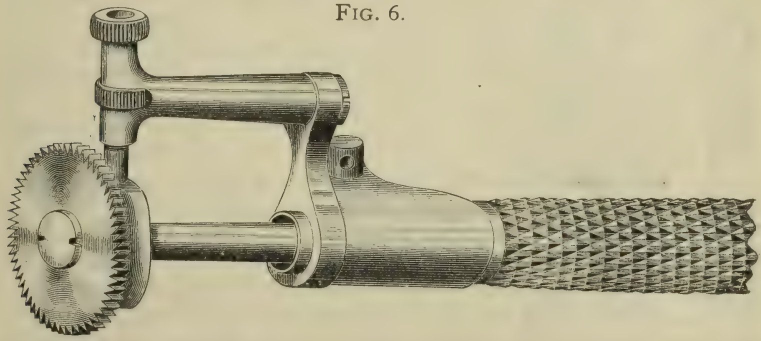
FIG. 5.



Two forms of spiral osteotome, one (Fig. 3) with dentate, and one (Fig. 4) with plain cutting-edges. Fig. 5 shows the osteotome mounted, with its button-like guard for cutting fenestra, etc., in the brain-case without injury to the subjacent membranes. Figs. 3 and 4 are twice the size of cutting-tool; Fig. 5 is full size.

The third operation is another one of Professor Garretson's, and it is similar to that described by Professor Agnew, excepting that it is made a little higher and opposite the inferior dental foramen, thus exposing the nerve at the opening of the canal, where it is seized by forceps and then dissected out from the tissue and secured as near as possible to the oval foramen. The difficulty in this operation is the lack of space. There is also much danger from hemorrhage, so that the operation is not as satisfactory as we could desire. Recognizing this, Professor Garretson adopted in its stead what is known as the Pancoast operation. This consists in making an opening through the soft tissue on a line with the lower edge of the zygomatic arch, separating the tissues until easy access is obtained to the coronoid process, and sawing it off. In this way both the inferior and superior maxillary nerves are accessible, and may be excised near their respective foramina of exit from the brain. The objection to this operation is that it causes too great a loss of the temporal muscle on that side. It is also difficult by such an operation to gain access to the nerve as it enters the inferior dental canal, on account of the awkward position and the intrusion of adipose tissue into the incision. The difficulty in taking the inferior dental nerve up from this point suggested to me some four years ago, that, instead of cutting away the coronoid process, the sigmoid notch might be deepened to the inferior dental canal. To do this, expose the bone, take a barrel-shaped surgical bur having a smooth or safe end ; remove the bone almost to the foramen, after which lift out the nerve, artery, and vein with a tenaculum, then separate and secure the nerve by hemostatic forceps above the point at which the mylo-hyoid nerve is given off ; draw as much of the nerve from the canal as will come, and cut the mylo-hyoid nerve as near to its point of origin as possible. If the dissected portion of the nerve is long enough, pass it into the neurotome ; if not, attach a ligature and pass it in that manner, holding the nerve tightly with the point of the neurotome in the direction of the oval foramen. When this instrument can be passed no farther, revolve the knife and cut it as in the other operations. I believe the Garretson operation last spoken of is the best one for removing the nerve at the oval foramen, if the neurotome hereafter described is used.

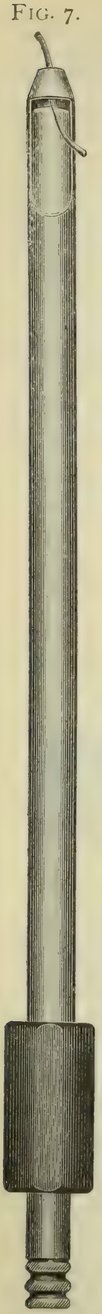
FIG. 6.



Circular saw with adjustable guard for cutting the brain-case to any predetermined depth.

The proper amputation of the nerve at the oval foramen is one which involves no little difficulty at times, by reason of the hemorrhage and the limitations imposed by the surrounding tissue, which interfere with direct vision. The bony structures offer an unyielding resistance to the use of any of the special instruments which have heretofore been used for the purpose. To obviate the difficulties which I have noted, and to furnish a means for the amputation of the nerve with certainty and precision at the exact point desired, I have devised an instrument which I call a neurotome. It is constructed

FIG. 7.



of steel, and consists of an outer tube with a fenestrated end, the free extremity of which is rounded or tapered, and having on its inside surface, near the end, a projecting shoulder which is continuous around the inner periphery of the outer or canular tube. The inner cutting portion of the instrument consists of a steel spindle which fits closely and smoothly within the outer tube, and has its free end fashioned into a tubular knife similar to a cork-borer or leather-punch. In use, after the nerve has been dissected out from its canal, its end is passed through the distal opening of the neurotome and out through the fenestrum in its side. The instrument is gradually pushed along the nerve, and worked in the direction of its foramen of exit. When it has been ascertained that the end of the neurotome has been brought into close contact with the bone at the foramen, and the nerve is made tense by traction, the central cutting-punch of the neurotome is driven home with a rotary motion against the shoulder mentioned before at the end of the outer canular tube, which will cleanly sever the nerve at the point desired, with no risk of injuring the deeper structures or the adjacent blood-vessels.*

The operation of deepening the sigmoid notch was reported by me in August, 1892, at the American Dental Association. It was published in the November number of the DENTAL COSMOS of the same year. The operation had been performed twice at the Medico-Chirurgical Hospital before I reported it. In an English journal for December, 1892, five months after I had described it, Mr. Victor Horsley, M.R.C.S., reported his operation of deepening the sigmoid notch, the principle being the same; the cutting of the bone being accomplished by different mechanical means. After an interview with this gentleman a few weeks since, when he made a minute examination of the improved surgical engine, he expressed himself as thoroughly satisfied as to its utility in simplifying bone operations. Sir Christopher Heath also expressed himself as much pleased with the Yankee invention.

It has been my desire, in bringing to your notice this cursory study of the technique of nerve-resections, to especially call your attention to the marked improvements in method which are the direct outgrowth of the application of dental thought, ingenuity, and inventiveness. If by so doing I have in some degree led you to share my belief that oral surgery is a department which, regarding the best interests of humanity, should be solely intrusted to the care of the properly trained stomatologist, I shall feel more than gratified.

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* Since writing the original description of this neurotome, Dr. T. Morton, of this city, has shown me one of his devising, the knife-edge being upon the external tube. This cutting-edge abuts upon a projecting shoulder from the fenestrated inner tube.

A PLEA FOR BRIDGE-WORK.

BY HENRY M. HILLS, D.D.S., BORDEAUX, FRANCE.

In a partial *résumé* of my practice in past years, I find no operations that have given better results and greater satisfaction to my patients and myself than bridge-work. By its peculiar adaptability it not only most successfully restores lost parts from an esthetical point of view, but it also fulfills the requirements of that greater necessity, namely, mastication.

Many writers have, with no little justification, deprecated the unequivocal adoption of this form of work for all, and I might say impossible, cases. No longer ago than the August number of the Cosmos, Dr. Guilford calls the attention of the profession to the evil and disastrous effects consequent upon the abuse and misconception of the principles involved in this new style of replacement.

There are so many favorable considerations, and such a fascination for bridge-work, that many skilled and a great many more unskilled have been tempted by its allurements, without the slightest regard to the ultimate results of their work.

It is not the advantages alone, however, that should occupy our serious consideration and attention, but more especially the difficulties that each individual case presents. Unfortunately, there is no unchangeable law or mode of procedure for each particular case; and inasmuch as there are no two cases that present themselves under the same conditions and circumstances, it behooves us to have a thorough knowledge and comprehension of the fundamental principles that govern this work, and, at the same time, a facility to overcome emergencies as they arise.

Besides being competent to successfully treat a root, to accurately adjust a band, and to properly finish and set a bridge, there are still other factors of vital importance, and to a great extent ignored, which should enter into the careful consideration of every case.

These factors are force, strength, and resistance, all of which are so intimately related and dependent on one another that a disregard for one endangers and acts detrimentally in reference to the others.

The element of resistance may be considered as confined partly to the bridge, but more particularly to the abutments. The element of strength lies practically in the bridge itself, and that of force and its direction consists in the amount of pressure exerted in bringing the jaws together, and in the character of the articulation.

Nature, as well as pathological lesions, present themselves in such a variety of forms that these elements necessarily differ, relatively, in a marked degree, in nearly every case, and failure often results from a lack or a preponderance of one over the other. To make clearer the thought that I wish to convey, let us suppose, in an exaggerated case, a bridge to be lightly constructed, or even placed upon weak supports without any occluding force. The probabilities are that the strength of the bridge would be sufficient, and that the supports would resist for an indefinite period of time; if, on the other hand, the occluding force should be strong or of an abnormal character, the results would be far less favorable, and success would vary as the ratio of the opposing forces varied.

There is still another point that suggests itself in this connection, and that is the direction of force. Bridges of sufficient solidity, and abutments equally firm, that are capable of resisting any direct or normal pressure, are ofttimes torn to pieces by an indirect force. These indirect forces are frequently created or aggravated by an irregular articulation. The most disastrous of all indirect forces is the lateral, whereby the jaw is moved forward or sidewise against the bridge as a lever. I recollect a case of six anterior teeth, supported by four solid roots, that was repeatedly torn from its anchorages, and eventually had two of the pivots broken off. The roots resisted, and the weaker part, the bridge, gave way. The real cause, however, of the trouble was this forward movement of the jaw against the bridge. As the patient had acquired the habit of masticating with the anterior teeth, the only remedy was to slightly raise the articulation. This was accomplished by replacing lost lower molars, which to a great extent mitigated the embarrassment.

So many complicated cases arise, where the conditions are so different that each one requires a special study, not only in an esthetical and physiological sense, but particularly from a mechanical point of view, so that the completed whole shall present not only a beautiful alignment of tooth and gum, but also a perfect comprehension of the harmony that should exist between those powerful opposing elements already referred to.

These latter factors are of far greater significance in the construction of bridges than that of single crowns or plates. Bridges are rigid structures, and, fixed as they are to several supports, they can only assume the movement as of one. The larger or more extensive the fixture, the more complicated become the forces that act upon it. Nature is generous in this direction, but there are occasions when it sees fit to relieve itself of burdensome intrusions. There are certain prescribed limits wherein we are allowed to operate, and as soon as we understand and comprehend the principles and laws that should govern us within these limits, and the failures and disasters that await us without, we shall have made some progress in the further development of this most interesting work.

During several years' practice in London and Dublin, I had the opportunity of examining bridges of all descriptions in the mouths of a great many patients. Very few patients, however, had occasion to speak disparagingly of the results obtained, although a great number of the cases were so badly conceived that the effect, as well as the stability of the work, was compromised from the outset, and naturally the outlook was anything but gratifying.

This misconception or lack of judgment can be accounted for in some respects from the fact that most of this work was performed by operators who were supposed to be able to crown or bridge anything that the fancy or rather the financial tendency of their patients dictated.

In most of the bridges that have come under my notice, I have found that those which were anchored in adjoining teeth by means of fillings, either of amalgam or gold, were the first to show signs of weakness or failure. Nor is it surprising, considering that the principle is entirely at variance with the results obtainable.

It is impossible to suppose that a crown approximal cavity of fairly good proportions can support the strain of mastication that is exerted on two teeth or even one additional tooth, when experience teaches that fillings, in similar positions and of similar dimensions, often break down by the force exerted upon them. Furthermore, by virtue of the elasticity of bone and the joint peculiar to the teeth, there is always a certain amount of movement to overcome, and the security that this mode of anchorage offers is not sufficient ; either the filling is loosened or the bar becomes detached. This class of work, like a great many others, has been successful in some cases, but particularly where the occlusion is slight or wanting.

There are also other cases that have come under my notice, where one or more dummies have been extended out from the bridge proper, forming levers that multiplied the natural occluding force, and which no supports could withstand.

I have also met with several extensive cases where the supports were weak, where the construction failed to harmonize with the conditions, and where the freedom of movement natural to the teeth was too severely infringed upon. Bridges of this description do far better service when constructed in sections, as in this manner they conform more closely to nature's arrangement.

I have thus far only referred to such cases where failure seemed the natural outcome ; cases where bridge-work had been abused, and again others where bridge-work would be more generously judged as contraindicated rather than condemned.

In all other bridges that I have had occasion to examine, as well as a great many that I have myself made, where the conditions were such as to indicate this form of work, I can only report my own convictions, which are based upon observation, reason, and experience. After a thorough investigation of bridge-work, as prepared and adapted by others, and from a sufficiently long period of personal practical experience, I have no reserve in concluding that there is no form of replacement that can approach in appearance, comfort, and utility that of a well-conceived, proportioned, and constructed bridge. I may also add, with propriety, another accompaniment to a finished bridge, that of cleanliness.

Up to the present time, cleanliness and a physiological condition of the mouth, in the replacement of lost teeth, in this country, and in fact all Europe, have not been factors of much consideration. Artificial teeth, in general practice, are inserted over roots in all conditions and stages of decay and decomposition, and over gums that are a fitting complement to the same. This mode of procedure has only one advantage, inasmuch as it retains the natural lines and contour of the face. This unclean and unhealthy state of the mouth, resulting from plates likewise inserted, can be obviated, to a certain extent, by properly treating and finally filling or capping the roots. But even this partial remedy is so seldom resorted to that the advantage above referred to, obtained by retaining these roots, is so minimized by comparison with the evil effects produced, that it can scarcely be otherwise considered than a pernicious practice. Furthermore, whatever precautions are taken to keep the mouth in as clean and healthy a condition as possible, these roots are always a source of chronic inflammation of the contiguous parts. This constant irritation produced by the plate and subsequent inflammation generally terminates by absorption of the alveolar processes, and ultimately leads to the extraction of the roots.

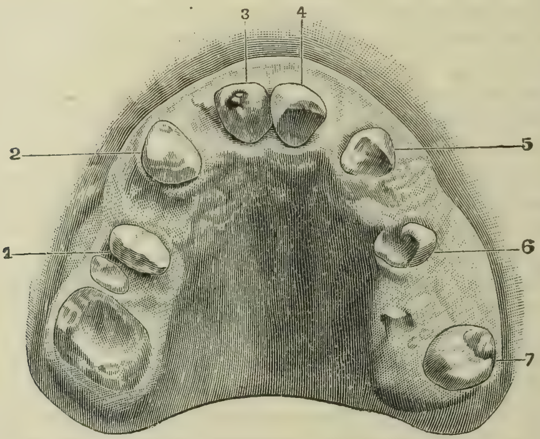
Although the mouth, under the influence of plates inserted in this manner, is continually in a diseased condition, it does not follow that this state of affairs should be indicated by discomfort or pain, inasmuch as pain is not always an accompaniment of disease. Herein lies the great danger attending this practice, for we should not forget, in considering the intimate connection of the mouth and its associate parts with the whole system, that these roots, receptacles of acrid and putrid matters, agents of abscesses and their attending evils, are frequently the unsuspected cause of a great many general, and particularly nervous, diseases.

It is to this class of sufferers that bridge-work offers a most wonderful relief.

I herewith illustrate a case in point out of my own practice, which fully illustrates the advantages of the new system over the old.

Fig. 1 represents the superior maxilla as it presented itself, except that the patient wore a gold plate covering one-half of the palate and several roots, and which served to replace four teeth. The only root which had been extracted was the left superior lateral. The natural teeth 1, 2, 5, 6, which served to hold the plate in position by means of bands and wires, were broken down, and with the others were in a state of suppuration. The gums were excessively inflamed and swollen, and presented several fistulous openings. The patient in question had suffered for some time from a disordered stomach, accompanied with headache, neuralgic pains, and a general sense of discomfort. It was evident, from an examination of the case, that it was not alone the inability to masticate food, incorporate it with saliva, and prepare it for reception into the stomach, but also the accompanying evils of decomposition, chronic inflammation, and pus-discharging abscesses, that had occasioned constitutional irritation and functional disturbance. The roots selected for supports, 1, 2, 3, 4, 5, 6, 7, Fig. 1, were carefully treated, and the remaining roots were extracted. The bridge was constructed in two sections, from central incisor to second bicuspid on one side, and from central incisor to third molar on the other. As the articulation presented itself favor-

Fig. 1.



ably, the teeth in front, eight in number, not protected with gold tips, were mounted on slides according to a system described in Evans's Crown- and Bridge-Work, and as shown in Fig. 2. The bridge proper was first placed in position, and the teeth, mounted on the slides, were afterward adjusted and cemented in place. This system of slides has one drawback, inasmuch as a close bite would not allow of a thickness of gold necessary for mounting the teeth in this manner. Where the articulation admits of its use, I find it the most convenient system, on account of the facility in replacing a broken tooth.

FIG. 2.

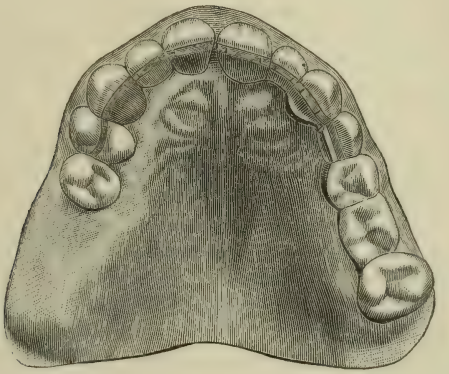
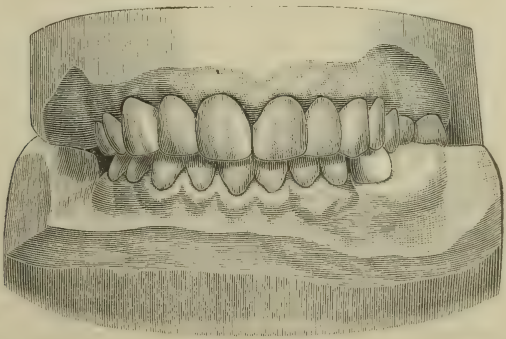


Fig. 2 shows the bridge as it appeared from an impression taken nearly three years after its insertion. There are no fistulous openings and no trace of inflammation, and the mouth is in a perfectly healthy condition. Fig. 3 shows the face of the bridge, with articulation.

There are many other cases that could illustrate as well as this one wherein bridge-work has proved itself to be the most hygienic, comfortable, and useful form of prosthesis up to the present day. It has taken its place in modern dentistry, and it will remain. It is not a panacea for all ills, as some would have it to be, but it has a strong foot-hold at that stage of dissolution where the foundations are still intact, but where the ravages of decay have overpowered the art of arresting it by other means.

FIG. 3.



ETIOLOGY OF DENTAL CARIES.

BY S. B. PALMER, M.D.S., SYRACUSE, N. Y.

(Read before the American Dental Association, Old Point Comfort, August 9, 1894.)

Mr. President and Members of the American Dental Association:

Your committee invited me to write upon etiology of dental caries; to be as brief as possible, and stick to the subject. I accepted the invitation, and hope to meet the conditions. In 1874—twenty years ago—I read a paper before the Dental Society of the State of New York, entitled "Chemical and Galvanic Action upon the Teeth, and Materials Used for Their Preservation." Nineteen years ago, another paper was read before the New York Odontological Society, entitled "Chemistry of Dental Caries." Two years later, the doctrines set forth in the previous papers were compiled and incorporated in the "Basal Principles of the New Departure." As a result, earnest discussion followed. The teachings were in advance of the times, and met with opposition both from prejudice and practice. Twenty years have passed, science has overcome prejudice, and the principles then objected to are empirically or scientifically admitted.

I am very thankful to meet the young members of this body who have been christened dentists since this subject was so fully discussed. As this will probably be my closing argument on the principles here presented, we will give a brief summary of the conclusions reached from experience and investigation of many years. Those who take up this work will have advantages of higher education, better facilities for experimenting, and free scientific discussions.

I am expected to present a scientific paper, and will do so; still, as the majority are more benefited by practical instructions, I have, so far as possible, given illustrations from actual practice. Instead of referring to galvanic batteries, I have taken various filling-materials for the elements of a battery, as they actually are, thus presenting applied science. Also, have made use of comparisons, defined principles, cited cases which have appeared in other papers bearing upon this subject. A lesson worth learning is not too often repeated while it is unlearned.

Let us divide the subject. First, matter; second, potential relations of matter; third, electrolysis.

First. We live in a material world, and it is through the agency of matter that we enjoy our senses. Chemistry teaches that there are nearly seventy single elements, and that they combine under natural laws to form numberless compounds. Let us first understand the principles which govern the composition and decomposition of matter. With that knowledge, take the elements contained in the human body, and follow the subject to its terminus in the oral cavity. It has been a study to write this in language so well understood as not to divert the mind from the subject; still, the first sentence contains a word most expressive that requires a definition. Dental caries is an effect of electro-*potential* relations of matter.

Second Division. The following definition of potential is from a late work on electricity: Whenever electricity moves, or tends to move, from one place to another, there is said to be a "difference of potential" between those two places. "The place *from* which positive electricity tends to move is said to be of a higher potential than the other.'' Thus power applied to a dynamo maintains the positive pole at a higher potential than the negative. By connecting motors between the two poles, cars run, lights burn, etc. Take a jar and partially fill it with an exciting liquid, in which immerse a plate of copper and zinc disconnected. The pole connected with the copper will be of higher potential than the zinc pole. No current is yet established. Connect the two elements. The potential is lowered; a current is set up, which continues according to the construction of the battery, of which there are many kinds. Instruments, when placed in this circuit, do their work,—ring bells, deliver messages in characters, or by articulate sounds. This is called the galvanic current. It is the phase of electricity which most interests operative dentistry. It is well to remember that the positive and negative relations of matter are not fixed, but relative to the two elements: thus, a battery with zinc and iron. The iron would be negative, and by reason of its connection with zinc the iron would be raised above its normal relations to the liquid in the cell. Thus, galvanized iron is protected from oxidation even when the zinc covering has been much wasted. Should the zinc plates be removed from the battery mentioned, and a plate of copper substituted, the iron would be depressed and become positive in its relations to the fluid. Substitute platinum or carbon for the iron—the copper would be positive. When we have reached the highest note in the potential scale, it is *oxygen* which we will endeavor to prove is the primary cause of dental caries.

Third. Electrolysis—description of the phenomenon. ''If a binary compound body in a liquid state has a current of electricity passed through it, it is generally decomposed into its constituent elements, one of which appears at each of the points where the currents enter and leave the liquid. *No elementary substance can be an electrolyte.*''

''*Electrolysis only occurs while the body is in the liquid state.* Free mobility of particles is a necessary condition of electrolysis. Nevertheless, electrolysis sometimes occurs in viscous solids, but only in proportion to their fluidity.'' This has a special bearing on the question, Are the fluid contents of a tooth an electrolyte?

Dental science has been kept in the background because subjects have been discussed *en masse*, regardless of specific conditions. Early in the announcement of the doctrines contained in this paper, strenuous efforts were put forth to overthrow the theory. The most damaging was given by scientists of authority, and being true under the conditions, it was supposed to cover *all* conditions and settle the question, as it did for those who trusted authority.

To convince you that these principles were previously taught we quote you the following from the paper read before the New York Odontological Society in 1875, entitled ''Chemistry of Dental Caries.'' We say ''etiology'' now, but the principles will ever remain the same. Quotation: ''We must start with atoms.'' Our knowledge of matter ends with atoms. It is by effects produced upon matter that we become sensible of various forces in nature. We have no time to speak of these forces in their relations to conditions, but will group cohesion, chemical affinity, magnetism, light, heat, and electricity, as different phases under different conditions, giving electricity the prominent position in *forces* that oxygen holds with the elements. "I believe electricity to be the bond of affinity which, through its polarizing influence, unites atoms, forms molecules, or builds mountains." Crude as the above appears, it shows that the so-called "electro-chemical theory" was founded on natural laws long ago.

Time will not allow me to mention the chemical processes by which minerals become food for vegetables, or how vegetables build up and support animal bodies. Enough to say that elements are dissolved and unite to form molecules. Molecules are decomposed and thus enter into liquid form, as sap, or blood, where it comes under the controlling influence of vital force, or current, to go where directed and perform the functions ordained, as positively and by law as truly as metals in the electro-plating bath are directed to and become a part of the articles to be plated. Vital currents direct organic compounds as electric currents do minerals. Here we are able to introduce the most important element of all, *oxygen*, which is the most abundant of the elements. It is the active principle in the atmosphere, of which it forms about one-fifth part. It is an important element of animal and vegetable tissues. There are other elements of importance which are found in animal bodies,—carbon, chlorin, etc., which for want of time cannot be taken into account. Now we lay aside the chemical plane on which we have studied the battery, and for want of time pass the vegetable plane, to work upon animal tissue. There are three planes: First, inorganic chemical; second, vegetable; third, animal. As we ascend, each becomes more complicated; still there is continuity of laws through all.

Organized tissues are subject to decomposition. We know that some chemical compounds are unstable. Saliva, for example, is liable to change from an alkali to an acid. The materials which compose our bodies are pre-eminently subject to decay from the unstable arrangement of chemical forces. We cannot say what life is. We can see what it does and what occurs when it fails to do. It decomposes, composes and lifts matter from the inorganic plane up into the organic, forms bodies or tenements in which to dwell, and during a period preserves them from decomposition. The moment the soul moves out, the body drops back into the inorganic plane and becomes an unstable chemical compound, and is given over for cremation by oxygen,—not wholly by the oxygen in the atmosphere, but that which forms a large portion of the tissue. To illustrate, Faraday says, "One hundred parts of steel alloyed with one of platinum are dissolved with effervescence, in dilute sulfuric acid, too weak to act with perceptible energy on common steel," the steel being rendered positive by the presence of platinum. The application is this: oxygen being a negative element distributed throughout the compounds, sets up an electro-chemical action, and decomposition follows. The same principle is involved when gold is malleted upon frail dentine; the bruised surface becomes a chemical compound and an electrolyte.

All teeth of frail, porous dentine, when filled with a metal which does not impart oxids, sulfids, or their equivalents, are condemned by the same law. The principle is this: As previously stated, all metals in the mouth stand at a potential above dentine, and the fluids to which the teeth are exposed. When the fluid contents of a tooth are an electrolyte, as already defined, decay is an effect. The above has to do with electro-chemistry and secondary decay, or decay produced by electrolysis. This brings us down to another condition,—decay arising from ferment organisms and organic acids. This is a *condition* of caries, not a theory to be discussed in opposition to what has already been given. For several years past this phase of caries has been presented to the profession, and I fully agree with the conclusions reached from this standpoint, that there is nothing more to be done. The labor has been immense; important discoveries have been made relating to chemical action in the mouth. Not less discoveries of antiseptics to prevent fermentation and destroy organisms. This condition does not embrace caries as set forth, nor does it present permanent remedies to arrest decay by the use of oxids. One is as much a condition as the other,—two parts of a whole; with either left out, the etiology of dental caries will never be settled.

The oral cavity presents complications not found elsewhere. It is bounded by vital organic tissue. The liquid contents,—saliva, food, mineral remedies, etc., and all, subject to thermal changes; the teeth so fixed as to contain the contents in pockets or cavities, and with all during periods when the mouth is open, in speaking or eating, an undue current of oxygen is brought in contact with the fluid which causes fermentation, as mouth-breathing plainly demonstrates, with consequences which have been fully described in modern articles upon this subject. Oxygen in this form is a gas, but none the less a negative element. The electrolyte to which it has access has been raised up to the animal or vegetable plane, in which condition it is ready to be acted upon. We can get an idea of the influence of the effects of oxygen by that produced by hydrogen peroxid, H_2O_2. The teeth would soon be destroyed by this additional amount of oxygen. As already stated, vegetable or animal compounds when deprived of vitality or circulation die and decay. Even an apple may be preserved for a long period, provided its organic construction is not broken up. Let the fruit be bruised or frost-bitten, the portion so affected, though the skin is perfect, begins to ferment, because that portion no longer sustains the relations of organic construction. Cut out the bruised portion with a thin, sharp blade, dry the surface, and the wound is healed. The same law governs in preserving dentine by filling; cut out the disorganized surface, insert a filling which excludes moisture and oxygen; there is no secondary decay. Bruise the surface by harsh gold or malleting; decomposition follows. In case the dentine is below normal, the deficiency of lime or non-conducting material should be supplied by an agent which is not affected by oxygen, the most convenient being an oxid, sulfid, or carbonate. The question was recently raised, "How is it, if oxygen destroys teeth, it also preserves them?" The ranchman on the prairie understands the danger of the effects of oxygen finding its way to his dwellings through prairie grass. At suitable times he burns a space around his stacks and dwellings; he has satisfied the demands of oxygen by oxidizing the environments. When the fiery storm comes, it stops at the line prescribed. The organic constituent of a tooth of low-grade structure is an electrolyte, and subject to the destroyer, oxygen. If the surface of the dentine is filled with a compound which has passed through the ordeal, the effect is to raise the positive element in potential to equal oxygen, and there is no current, no decay.

To give a partial illustration of this principle, as well as to illustrate the difference between the two conditions mentioned, imagine a child whose deciduous teeth are decaying. Put the same under the best known antiseptic and prophylactic treatment. In addition, treat all the cavities and softened dentine on one side of the mouth with nitrate of silver without excavating or filling. The results will establish two facts : (1) That the chlorid or oxid of silver raises the potential of dentine above the secretions of the mouth ; (2) that it is more durable than antiseptics.

The following is from the paper mentioned, written nineteen years ago : "It is on this principle that nitrate of silver acts when it turns the teeth to a dark color and checks caries."

We are now prepared to announce oxygen, under the laws which govern the positive and negative relations of elements, as the primary agent that produces dental caries. We see a manifest demonstration of this universal law during electric storms, between the potential of the atmosphere and the earth, between the north and south poles of the globe, or a magnetic needle. The dynamo has its poles ; so do the elements in a battery, as well as galvanic and electric currents. The same law is visible in the union of oxygen and hydrogen, gases, acids with alkalies, etc., lacking poles by which to generate currents.

As proof that oxygen is the cause of caries, we use in practice remedies to arrest decay, or satisfy oxygen, oxids which are proof against oxygen, and in doing so recommend fillings which furnish oxids by being oxidized, or lining cavities with the material ready prepared, in contrast with gold, which furnishes nothing. A metal filling in the mouth is of a higher potential than are the organic constituents of dentine. Dentine below normal is an electrolyte. Thus there is a current from the filling to the dentine which will decompose the moisture in the dentine, thus liberating oxygen which is attended with acid. Dissolution of the lime-salts is the result. Gold furnishes such current. Thus decay around gold fillings in frail dentine is according to a law which manipulative ability cannot counteract. In establishing the principles under discussion, we deal with oxids, but wish to be understood that compounds of carbon, chlorin, sodium, calcium, etc., produce like effects. Time forbids mention of more than oxygen. To use a plain figure, people seldom have smallpox more than once, and the disease usually honors a genuine scar. The same law prevails with attacks of oxygen. It is well known that tin preserves frail teeth better than gold. The reasons are, (1) Tin is easily adapted to the walls of the cavity, thus insuring perfect plugs ; (2) its conducting power, according to Cassidy, is given as follows :

Silver	1000
Gold	532
Tin	145
Normal Moist Dentine	15

Thus tin is a poor conductor, and its potential standing would doubtless be lower than its conductivity. But its most important virtue consists in furnishing an insoluble stannic oxid, between dentine and the plug, through which oxygen will no more pass than it will pass through a wet surface to burn wood. This process is simple oxidation, quite unlike that which occurs when tin is used for the same purpose, to line cavities under gold. The following is the result of patient study, and I believe the conclusions are correct.

When gold and tin are joined in a filling, the portion which is exposed to moisture interchanges atoms by electrolytic action, the same as though mercury was placed on gold. There is an alloy of tin and gold at the union by which a portion of the tin is raised by induction to the same potential as gold. This influence does not extend into the tin beyond one or two thicknesses of tin foil. When tin is used to line cavities for guard fillings under gold, not to exceed two layers of ordinary tin foil, the dentine will be furnished with a carbonate, and gold can be used when it would otherwise prove a failure. Here is a point which should not be overlooked. An excess of two thicknesses of tin, limited to three or four layers, the tin will be dissolved except that first mentioned. The black compound thus formed will be soft, not of sufficient body to resist brush or pick. No decay occurs so long as the paste remains. I should add that when a considerable body of tin is used as a guard filling, no such softening occurs. A plug made of tin and gold, one-fourth or one-half tin, the rest gold, the joint is perfect and the tin is solid throughout. Without the body of tin for backing, the thin layer is exposed to galvanic action, aided by the moisture in the dentine, without the metal to form a hard oxid. At least, the results are as stated. I claim nothing for the combination of tin and gold ; I only speak of the science of its combination so that universal results may be obtained. In the paper read twenty years ago, the prejudices were so strong against amalgam I dared not establish the principles upon it, but used tin as we have already done. We feel free now to produce evidence from any source which will be of interest to the profession.

I hold the same views regarding amalgam and its influence in producing caries as I did many years ago. The most serious objection to amalgam is what is called shrinkage ; it *is* that in effect.

Amalgams are made which do not shrink as tested by the most delicate instruments, which also stand fluid tests in tubes ; still, when worn in the mouth, do admit fluid circulation which reduces the plug and enlarges the cavity. This statement is not made without scientific proofs.

Amalgam which is composed of alloy, cut or filed, and mercury, differs from gold and tin in this respect : it is not a homogeneous compound ; it contains, besides the two or more metals that compose the alloy, two elements of different potentials, or positive and negative relations. There is a positive which is amalgamated, and minute particles of alloy *partially* amalgamated, distributed throughout the mass. This can be demonstrated either by dissolving an amalgam filling in dilute acid (a metallic powder of the unamalgamated alloy will remain), or by filing a flat surface on an old filling. Wet the polished surface with acid, and slowly draw over it a fine point of platinum in circuit with a galvanometer ; the needle vibrates with great rapidity from positive to negative as the negative and positive elements are reached. This is a condition to be encountered in all amalgam fillings. The setting of amalgam depends upon the filings taking up the mercury. The alloy must be in excess of what is absorbed at mixing, or the plug would be too soft from excess of mercury. The outcome is this: each particle of unamalgamated alloy is an element negative to the other portion, which is perfectly compounded; consequently there is local galvanic action all over the surface of the filling. The chemical effect is this: as soon as moisture returns to dentine, in contact with amalgam, galvanic action is established; in *normal* dentine oxidation fills the dentine with oxid or sulfid, and no harm is done. When the plug is inserted into a cavity below normal, unless the alloy contains copper or some metal that will readily give off a compound to fill the dentine, the mercury will be dissolved from the alloy, which gives the roughened appearance of all inner surfaces of amalgam plugs. Nor is this all; when local action is too vigorous the lime element of the dentine is dissolved, and thus the cavity enlarged and the plug reduced. This state of things occurs always under the same conditions. To meet it we need to change conditions, and if it was *filling teeth*, instead of caries under discussion, we would mention lining cavities to overcome the difficulty; but this, and I think the most important remedy, *is* a part of our subject; and for this alone has amalgam been introduced in this connection. This lesson came from studying battery action. It is well known that commercial zinc contains other metals, iron being the most common. Small particles of iron are distributed throughout the zinc, and cause local action on the surface, in dilute acid so weak as not to dissolve pure zinc. This is analogous to an amalgam filling with particles of unamalgamated alloy.

The remedy for local action on zinc is to amalgamate the zinc which covers the iron. There is but one element presented to the action of the acid; that is mercury, or I might say, an amalgam of mercury and zinc. The action of the acid through the agency of the current is to dissolve the zinc, while the mercury prevents the acid from exciting the iron. Thus no local action occurs on the zinc while covered with mercury.

The same principle governs amalgam. Local action goes on when the moisture reaches the plug, because the unamalgamated filings are negative to the general mass. By lining the cavities with one or more layers of tin foil, which is readily done by covering the cavity with tin, pressing it down with a ball burnisher or soft compress, no matter if the tin overlaps the cavity, the mercury readily cuts it off at the enamel border.

By this lining the benefits of tin are realized through oxidation, which does not discolor dentine. The tubuli are filled with an insoluble compound; no local action takes place to cause shrinkage of plug. A high grade of amalgam may be used. I have not used copper in amalgam in over a year. The preserving qualities of amalgam consist in the oxid or sulfid imparted to porous dentine. Stannic oxid is not objectionable in color, and it prevents shrinkage from galvanic action, as occurs in amalgam without lining. Time forbids taking up root-filling. In addition to what has been given in late treatises on this subject, where antiseptics are recommended, I will offer suggestions from my present practice which are based upon the same principles as for crown fillings. We are to remember that the root-canals of teeth, or pockets around roots below the gingivæ, are in an alkaline instead of acid field; that is one of the conditions where oxygen gives alkaline reaction. Thus root-canals, though unfilled, do not become enlarged like cavities in crowns, hence acid treatment is indicated and beneficial in destroying micro-organisms thus located.

The one important point I will mention is that antiseptic remedies serve me best which are held in solution or mixed with *aqueous* liquids. I will give my reasons, based upon a year's observation with scores of experiments. Bear in mind that I have reference to the minute capillary canals at the apex of the root only, including those so curved that a fine broach cannot be passed through, and those where the pulp is extracted at the time of filling. To illustrate, I will describe a case treated the day of this writing. A superior cuspid had been previously treated for devitalizing the pulp, which came away readily to the finest point. Slight hemorrhage followed. Oxychlorid was placed upon the slab ready for mixing. Some of the liquid was introduced, which checked bleeding. A thin mix was made and the canal filled. A fine gutta-percha point was introduced, which reached the apex and forced out the excess of fluid.

This treatment has been recommended, and is not offered as new. But why use the solution of oxychlorid instead of carbolic acid, creasote, or the essential oils? Because the chlorid of zinc with the oxid of zinc mix readily with the water in the canal. The point or opening is a spring which cannot be dried. Capillary attraction keeps the fine canals filled until the leak is stopped. Notice what occurs when any oily substance is used. Unless by pressure the water is forced out of the root, water remains and a portion of the oil next to it, which I cannot volatilize even with broaches heated by electricity. In time the oil is oxidized ; there being no mineral substance to form an insoluble compound, the canal becomes filled with septic matter. With all that has been accomplished, root-filling has not been reduced to a science by which positive results are assured. I believe in the principle introduced in this paper, that oxygen is as much the cause of putrefaction in roots as it is in crowns, through fermentations and acids The most successful treatment for root-filling is evidence of this statement. Chloro-percha and gutta-percha points are used with fair success. Why? The water is driven out and the opening closed. The filling, of course, changes and becomes odorous from gases arising from some change in the gutta-percha, not of the oxid. On the average, gutta-percha filling consists of about one part gutta-percha to five and one-half oxid of zinc.

The permanency of gutta-percha consists in the oxid which remains after the gum has undergone change. The preponderance of the oxid prevents further oxidation. Again, look at oxychlorid for filling roots and lining cavities. Both the fluid and the powder confirm the statements. This is a compound containing a chlorid and an oxid in an aqueous fluid, which mixes readily with that in the root. The benefits of chlorid of zinc over oxyphosphate for filling roots consist in the chlorid, which contains zinc, in addition to the powder, while the liquid phosphate is non-metallic. Doubtless there are other oxids better than oxid of zinc. Chlorids and carbonates answer the same purpose ; they should be used in aqueous solutions. I am not pretending to say that oxychlorid is the best material for filling canals. I wish to establish a principle, and save you the trouble of wasting time trying to overcome natural laws, except by change of conditions.

In the discussion of the paper read twenty years ago, a member said as follows: "Dr. Palmer has given the society his views upon the subject. He has made statements, but they all seem to be *ipse dixit.*" And this has been true with much that has been said since, because there are no books for authority, with no little opposition, and only a few individual supporters. To prevent repetition of this *ipse dixit* in relation to the difficulty of drying canals, volatilizing oils, etc., in the mouth, I will put proof in your own hands. Particularly this should interest every professor of operative dentistry. With very simple apparatus, which will be described, and a few hours' experimenting in the laboratory, knowledge can be gained of what is not done, that practice in the mouth fails to furnish. Drying open-ended root-canals and volatilizing oils with hot-air currents or heated broaches is much more satisfactorily done in the mouth or on paper than in glass canals in the laboratory, where imperfections can be seen. I will describe the apparatus for the reader who may not see the card to be passed around.

Take a clear glass tube, size about No. 9 or 10 wire gauge, heat a section with a blow-pipe or over a small flame of a Bunsen burner, draw the ends quickly apart, break the thread of glass the distance from the tapering ends desired for the length of root, and with a sharp file cut across the tube at the beginning of taper. The artificial root is ready, funnel-shaped and tapering to a point. Take a piece of copper wire, No. 19 or 20, point it as a broach, secure it in a handle. Improvise pliers for holding glass root, and with a small alcohol lamp the apparatus is complete. Touch the point of root to water, and it will be filled before it can be withdrawn. Hold the broach over the flame, back of the glass tube. See how long it takes to dry it. Wind the end of the tube with cotton saturated with colored water, and try to dry it. Put any oil in the root, and try to volatilize it with the hot broach. Take a tube and fill it with paraffin or wax, and it is done perfectly; but that is not a condition found in the natural root in the mouth. Either water or oil remains at the apex. Take a glass root in that condition and fill it with wax. At the point will be found a soapy mixture quite unfit for permanency. The above experiments are well worth a trial for any one who desires to know what is done, and what cannot well be done.

In closing, I believe that etiology of dental caries is the effect of a universal principle based upon the potential relations of matter, oxygen being the principal element, aided by electrolysis and capillary attraction under direction of electrical energy.

METHODS OF DESTROYING DENTAL PULPS.

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(Read before the New Jersey State Dental Society, July 18, 1894.)

THE many articles written and the frequent discussions of this subject are evidences of its universal interest. With but few exceptions, all are on the use of arsenic for this purpose, as, since its introduction nearly sixty years ago by Dr. Spooner, hardly anything has been found to take its place. The many theories advanced as to the best method of applying it, and the almost universal expression of unsatisfactory results, show the necessity of something better for this purpose. The application of arsenic in a tooth causes pain more or less severe, continuing from one to several hours. How to obviate this pain is an important question. One advances a theory explaining why arsenic should cause pain, and gives directions for making the application, affirming that no pain will result. Another follows these directions, but with an entirely different experience. Then, to harmonize the different experiences, we hear this phrase often repeated: "Arsenic works differently in different localities." My experience, like that of many others, has been so unsatisfactory that I question the statement that arsenic always works satisfactorily and painlessly; and so I have attempted many experiments. In my experience, if arsenic was placed in a tooth when there was no exposure of the pulp, pain always resulted; but when applied to an exposed pulp, I have sometimes succeeded in devitalizing it without causing pain. With many this is a light, steady, annoying pain, lasting for several hours, exceedingly exasperating; and with others a severe, throbbing pain, almost unbearable, but not continuing more than an hour or two. One writer has said, "The pain resulting from the application of arsenic is evidence that the arsenic is doing its work, and when the pain has been severe we are sure to find the pulp devitalized in a few hours; that if there is no pain, it will take days or weeks for the pulp to die." So he announces, as a rule to follow, that the length of time arsenic should be left in a tooth must be governed by the amount and severity of the pain. Another serious objection against its use is that it frequently excites more or less inflammation of the pericementum. The recent experiments of Dr. Kirk with coagulants in pulp-canals demonstrate very clearly that whatever care we may take in sealing medicines in the cavity of a tooth, we cannot prevent their exerting more or less influence on the pericementum. From my experience in the use of arsenic I have deduced a few rules. First, to always make the application in the morning, to allow the patient an opportunity to have it removed in the afternoon if the pain is severe, instead of compelling him to endure the pain during the night. Second, to always make the application to an exposed pulp. I use a piece of blotting-paper, which is saturated with creasote. On this is placed the least possible amount of arsenic, then a little powdered cocain, and this I cover with cotton and sandarac varnish or wax, using care not to have any pressure on the pulp. This I leave in the tooth from two to three days. Frequently cases present with severe pulpitis, but no exposure. In such cases as these, many advocate saving the pulp, relieving the pain by reducing the inflammation, and then filling the cavity. My experience has been that wherever there has been odontalgia arising from any disturbance of the pulp, every attempt to save the pulp has been a failure. In these cases, to apply the arsenic without first exposing the pulp subjects the patient to an ordeal to which I would not submit myself. My personal experience of suffering from such applications has stimulated my search for something better. To expose the pulp in these cases used to be a painful operation, but practiced because I believed the temporary pain obviated a long period of suffering.

The process known as "knocking out" answers very well in certain cases, and these are in the anterior teeth having single pulp-canals and the tooth well cut away, allowing free access to the pulp. A sharp stick is shaped to go the length of the canal, and with a mallet, by one blow, is driven into the pulp. This method is sometimes a failure as a result of miscalculation of the size of the canal, thus necessitating a second application of the stick, to which the patient is apt to interpose serious objections.

Carbolic acid is sometimes used, applying the crystals to the exposed pulp, cauterizing the surface, then removing the cauterized part, and following with another application of the acid, continuing this way removing the pulp in parts; a very slow, tedious operation for both patient and operator, and attended with more or less pain. A method hardly to be advised, as it offers no advantages over the "knocking-out" process.

Cocain is advocated by a few for the purpose of removing pulps, and as right methods for its use become better known, the efforts will be more successful. Cocain as a local anesthetic was first brought to notice in this country by the publication in the *Medical Record* of October 11, 1884, of a letter from Dr. Noyes, of New York, then studying in Germany. On November 13 following, I read a paper on "Hydrochlorate of Cocain," before the Connecticut Valley Dental Society, one sentence of which I quote: "What has already been accomplished with cocain leads us to believe that by its use we can banish arsenic from our practice, for if placed on an exposed pulp it should so benumb it as to allow its removal to be a painless operation." Ten years have almost passed, and we are just beginning to realize that cocain can be successfully used in place of arsenic for devitalizing pulps. The first few months after the publication of the above-mentioned letter, many experiments were made with this drug on the pulp. Because of its complete success as a local anesthetic when applied to the eye we thought it would have an equal effect on the pulp, but our experiments were not a success in the line we had hoped. While we found it did exert an influence, it was not sufficient to allow of the removal of the pulp or of the insertion of an instrument into it. Since then only a few have continued their experiments, and only within the past year has a successful method been brought before the profession. Occasionally items have appeared in dental journals like the following: "To remove the pulp, apply crystals of cocain and allow to stand ten minutes, when the pulp can be easily removed." Any one who has had much experience with cocain will give such items very little credence. When one reports a painless operation on the pulp, he wants to bear in mind that there are always two sides to a report. When an instrument is applied to a pulp it makes a great deal of difference which end of the instrument you hear the report from.

A little over three years ago I commenced a series of experiments with cocain, using the hypodermic syringe and injecting the solution (a four per cent. I find sufficient) into the pulp. Emboldened by success with the first case attempted, I have continued my experiments, and now I do not hesitate to attempt its use in every case. During the past year I have only resorted to arsenic in four cases, the reasons for which I will give later. My method in detail is as follows: if possible I apply the dam, as it is necessary to keep the cavity dry until the pulp has been injected. After drying out the cavity I uncover the pulp, and this is done in an almost painless manner by first blowing on warm air, then an application of a saturated solution of cocain in alcohol and ether or chloroform equal parts, allowing this to remain about thirty seconds, then another application of warm air, continuing in this way till sensitiveness is wholly obtunded. As soon as the pulp is exposed,—and I only desire to expose a spot as large as the point of my hypodermic needle,—I apply crystals of cocain and moisten with campho-phenique. After standing thirty seconds I apply warm air for a few seconds, and then attempt to work the crystals into the pulp. In from two to ten minutes I am able to introduce the needle of the syringe without pain. With a quick push I force the piston down and at the same time force the needle into the pulp, and it is instantly benumbed.

I immediately with burs proceed to open up the pulp-chamber and remove the body of the pulp. As I reach the canals I occasionally find a little sensitiveness, when I have to inject each canal. I then remove the dam, and proceed, with one exception, as I always do in treating a pulpless tooth. First, I have the patient rinse the mouth with a solution of hydronaphthol; dry out the cavity and flood it with hydrogen peroxid, and with a Gates-Glidden drill ream out the canals, at the same time the drills remove the pulp-tissue, and working the drill in such a manner that the peroxid is always in advance of the instrument. When the canals are thoroughly cleansed I wipe them out, and—this is the exception noted above—I pump into each canal a saturated solution of zinc chlorid or carbolic acid, preferring the former. I do this to destroy and render harmless the minute remnant of pulp which it is impossible to remove from the constricted portion at the end of each root. If this precaution is not taken there will be more or less pain after the root is filled. As soon as the influence of the cocain has passed, sensitiveness returns to the remnant end, and if the canal is filled as thoroughly as it should be, there will be pressure at the end of the canal, causing this pain, which will not subside till the filling is removed. I allow the zinc solution to remain in the canals while I am preparing the gutta-percha points; then I again wipe out the canals and pump in a saturated solution of iodoform in eucalyptol, and immediately press in the gutta-percha points to the end of each canal, and proceed to fill the cavity.

When patients come in complaining of toothache, and the pulp is still alive, if I am able to give ten to fifteen minutes, I proceed at once to remove the pulp and fill the canals. If there is tenderness on pressure of the tooth, showing that inflammation has extended to the pericementum, I give the patient, as I dismiss him, a few capsicum plasters to apply to the gum over the tooth. When I cannot give any time to the patient, I wash out the cavity with warm water, moisten a pellet of cotton in creasote and oil of cloves,—equal parts,—sprinkle on a few crystals of cocain and seal in the cavity. This generally gives instant relief, and I endeavor to attend to the case within the next two days.

The question will be asked, Is this method of removing pulps a painless one? I answer, Yes and No. In the majority of cases it is painless, but with some there is a little pain. In the four cases referred to above I was not able, after trying for fifteen minutes, to enter the pulp,—three of these teeth were inferior third molars,—so I resorted to arsenic.

The pulp of a tooth is composed of blood-vessels and nerves. It has a special sensory function, and while it does not have the tactile sense, it has the sensory function highly developed,—as much, if not more so, than any other organ in the body. While to a touch it responds quickly with a shock of pain, it is seldom that a person can correctly locate the tooth from which the pain proceeds, thus showing the decided difference between the tactile sense and the sense of pain. Words fail to describe the intense suffering produced when an exposed pulp is only slightly touched, therefore in all operations on the pulp the operator should constantly bear this in mind. To remove pulps in the manner just described requires judgment and patience; needless suffering will ensue in any attempt to hurry. Within the past two years I have removed nearly one hundred and fifty pulps by this method, and in only one case did I have to remove the filling in the canal, in which instance it was in the left superior cuspid of the writer, and this because I neglected to apply the zinc chlorid after reaming out the canal. Naturally, my personal experience of the entire absence of pain while injecting and removing the pulp from this tooth carries more weight, in my own mind, as to the painlessness of the operation, than the testimony of all the other patients operated on.

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PROCEEDINGS OF DENTAL SOCIETIES.

ACADEMY OF STOMATOLOGY.

THE regular meeting of the Academy of Stomatology was held October 6, 1894, at 1513 Walnut street, Philadelphia; the president, Dr. Louis Jack, in the chair.

The Council, through its secretary, Dr. Kirk, reported the result of the election of officers held at the meeting of July 7. It was as follows: Dr. Louis Jack, president; Dr. S. H. Guilford, vice-president; Dr. A. W. Deane, secretary; Dr. H. C. Register, treasurer; Dr. J. R. Yorks, librarian. The Council: Dr. James Truman, to serve three years; Dr. E. T. Darby and Dr. E. C. Kirk, to serve two years; Dr. D. N. McQuillen and Dr. Robert Huey, to serve one year.

The secretary of the council also reported the resignation of Dr. Truman from the council, and of Dr. A. W. Deane as secretary.

By ballot of the Academy, Dr. M. H. Cryer was elected to fill the vacancy in the council caused by the resignation of Dr. Truman, and Dr. Geo. D. B. Darby to the position of secretary, in place of Dr. Deane resigned.

The paper of the evening was read by Dr. M. H. Cryer, of Philadelphia, entitled "The Technique of Nerve-Resections for relief of Pain about the Head and Jaws." (See page 849.) Before reading the paper Dr. Cryer presented a patient for examination upon whom an operation had been done by means of the improved surgical engine, for the removal of a morbid growth affecting the right superior maxilla.

Describing the case Dr. Cryer said, "The patient reported at my dispensary in April, with what appeared to be a large alveolo-dental abscess. As I had given but a hasty glance at the case, and supposing it to be an ordinary case of abscess, I reached for a lancet to open it. As soon as I obtained a satisfactory view of the mouth, I saw that it was a morbid growth with which I had to deal. I ran an exploring needle in full length without striking healthy bone or discovering pus, the interior of the growth being of a soft, pulpy character. I sent the patient away and told her to come back in a few days, in order that I might have an opportunity to think over the matter. When she returned I put a small section of the growth under the microscope, and found it to be a giant-cell osteosarcoma. Of course this was alarming. After consultation with Professor Garretson, it was decided that the only thing to do was to remove the growth and remove it thoroughly, to accomplish which an incision was made through the median line of the upper lip, around the ala of the nose, and the flap thrown back. With an oval bur revolving at high speed in the surgical engine, all the softened tissue involving the external walls of the antrum, the alveolar border, and including the maxillary tuberosity, was thoroughly removed. This necessarily involved the loss of all the teeth in the upper right jaw as far forward as, and including, the cuspid. After the diseased portions were thoroughly removed the surfaces were scraped out clean with the engine-bur, until when the finger was passed over it the cavity was as smooth as healthy bone.

"In operating with the engine you can readily tell by the feeling of the instrument whether healthy or unhealthy bone is being cut. After the parts were carefully syringed out and the hemorrhage stopped—for of course we had severe hemorrhage to deal with—we packed in strips of iodoform gauze about three inches in width until the cavity was packed as thoroughly and solidly as we could make it. The external incisions were closed, the lip being turned down to its position, and three hare-lip pins put in the lip below the nose. Five or six sutures were required for closing the external incision. The operation was done on Saturday. On Monday we removed the upper pin; on Tuesday, I think it was, we removed the lower pin and a few of the stitches, and at the same time also some of the iodoform gauze, pulling it out very gradually under antiseptic irrigation and clipping off the extruding portion. By the following Thursday the remaining pin and all the stitches were removed, and on Saturday we removed the remainder of the gauze packing. The patient was on her feet and could have gone home, but we were so pleased with the progress of the operation that we insisted on her staying another week. There is a small opening in the roof of the mouth, but the lines of the external incision are almost obliterated."

Upon invitation of the essayist, the members were afforded an opportunity to examine the result of the operation described, and much satisfaction was expressed with the condition of the patient, there being little or no mutilation discernible.

Dr. Cryer then demonstrated the method which is generally used and has been in vogue for many years for performing the operation for removal of one-half of the superior maxilla, and explained the advantages which the surgical engine has for the performance of operations of this character. He demonstrated upon human crania and upon sheep-skulls the various operations alluded to in his essay, describing the technique of various nerve-resections in which he employed a neurotome of his own invention for cutting a nerve-trunk in close relationship to its foramen of exit without the slightest danger of injury to contiguous blood-vessels. He demonstrated also the use of the spiral osteotome for making fenestra in the brain-case for operations upon the brain, showing the comparative ease and absolute safety by which the calvarium may, by this method, be opened without injury to the dura. The point of the osteotome is protected by a button-like guard, which not only prevents injury to the membranes but serves to dissect them from the inner surface of the bone during the cutting progress of the instrument. He explained the special advantages of the surgical engine for this work over the methods previously employed, where the mallet and chisel were used, stating that danger to the membrane was entirely avoided, and surgical shock from the heavy blows of the mallet eliminated.

Incidents of Practice.

Dr. Gaskill gave a further report upon a case of resorption of tooth-structure which he had presented before the Odontological Society of Pennsylvania at one of its recent meetings, and said, "For the benefit of those who were not acquainted with the case I will say that the patient presented himself about two and a half years ago with a very remarkable condition of resorption of the tooth-structure in his central incisor through the agency of the pulp. The pulp had increased so much in size, and the resorption of the tooth-structure had proceeded so far, that the pink color of the pulp was plainly visible on both the labial and palatal aspects of the tooth as a well-defined spot. Shortly afterward, the thinned wall of the labial surface crushed in during mastication. I removed the pulp and filled the chamber and canals, since which time the condition of the tooth has been quite satisfactory. About two years after this the other incisor presented the same appearance, the pulp distinctly showing through the walls of the enamel as in the previous instance. At Dr. Kirk's suggestion I placed the patient upon systemic treatment with iodide of arsenic and Fellows' "Compound Syrup of Hypophosphites," hoping that a normal condition of the pulp might result. This has proven to be the case. There is now a deposition of dentine around the pulp-chamber, so that the spot on the labial wall is scarcely visible, and it is almost imperceptible on the palatal wall. I have been watching the case very closely, and am having the patient report periodically. The process of repair seems to be going on satisfactorily."

Dr. Truman stated that some time ago he had received a letter from a dentist in New Mexico, who sent him a bottle of what he denominated Balsamo del Deserto, or Balsam of the Desert. He also wrote an article describing its uses. In his letter the writer stated that he had been using this preparation for a number of years as a root-filling material, filling pulp-canals by means of it with so much success and lack of subsequent inflammatory action, that he thought he ought to publish it for the benefit of the profession. Dr. Truman wrote to him that the preparation had a strong odor of cinnamon, and that in his judgment its antiseptic action could not be entirely due to the balsam. He replied that he had put a little cinnamon in it. The preparation is used by working it into the canals with a hot broach. The balsam is very adhesive, adhering strongly to the teeth, so strongly so in fact that it will displace water and adhere to a wet surface. In cases of chronic abscess he had forced the balsam through the apical foramen, and a cure had followed. A small bottle of the material was exhibited for inspection.

Dr. Kirk. There is one point that occurs to me in this connection. The material presented seems to belong to the balsams, and probably has some antiseptic value. From correspondence and conversation with dentists who practice in tropical or semi-tropical countries, I believe the difficulties with which they have to contend in the matter of pericemental inflammation are quite different from those which we meet in this climate. In other words, pericemental inflammation is likely to occur in our climatic conditions unless the treatment is much more thorough and elaborate than he has indicated. It is undoubtedly true that in certain dry southern countries there is a lessened tendency toward pericemental inflammation, and the line of treatment indicated by the writer would probably be more successful there than in this climate.

Dr. Truman. I did not present it with a view of advocating it at all. It is an antiseptic, and in cases of deciduous teeth it might be a great advantage.

Dr. Jack. Perhaps the antiseptic property may be due to the oil of cinnamon which it contains.

Dr. Kirk. There is great need for a suitable material with which to fill the roots of temporary teeth. The substance under consideration may be very valuable in the treatment of the roots of children's teeth which have been undergoing absorption. To meet this class of cases I have used, with good effect, Dr. Van Woert's preparation of iodol, oxid of zinc, and carbolized cosmoline.

Dr. E. T. Darby exhibited for inspection some pulp-canal instruments, extractors, and exploring instruments of his own making, made by grinding down piano-wire under a stream of water, thus preserving the temper. A great variety of instruments was shown which were susceptible of being introduced into the most tortuous canals, without any danger whatever of breaking. He challenged any one present to break them by bending or twisting. With these instruments he believed he could extract pulps from almost any root-canal.

Adjourned. GEO. D. B. DARBY, *Secretary.*

NEW JERSEY STATE DENTAL SOCIETY.

THE twenty-fourth annual meeting of the New Jersey State Dental Society was held at the West End Hotel, Asbury Park, July 18, 19, and 20, 1894.

The meeting was called to order at 10 o'clock A.M. by the president, Dr. E. M. Beesley, and opened with prayer by the Rev. Dr. Scudder.

After the calling of the roll by the secretary, Vice-President Holbrook took the chair, and the president read his annual address, of which an abstract follows.

After welcoming the members and guests present, and calling attention to the loss which the society had sustained by the death of Drs. Worthington Pinney and W. S. Holbrook, both of Newark, he directed attention to the importance of the convention of representatives from the dental examining boards of New York, Pennsylvania, Rhode Island, Delaware, Connecticut, District of Columbia, and New Jersey, which was there in session by invitation of the New Jersey State Society. He referred to the important relationship of the trained and educated dentist to the welfare of his patients, and to the necessity for attention upon the part of all practitioners to every factor which tends to elevate the standard of their art, as well as "to avoid all things which would dispel the high ideal which it is the aim of this society to inculcate and maintain, that dentistry is an honorable profession." As having direct bearing upon the matter of elevating the professional standard, he said, "The most careful attention must be paid to the personnel of those who practice as members of our profession. The best place to observe who enters an assembly is *in line* at the threshold, and equally necessary is it to there resist the entrance of the unfit. It is far better and easier to repel than to eject. Therefore it would seem essential that some rule should be adopted by this society, binding on all its members, requiring some examination in the ordinary English branches of those persons, few though they may be, who shall register as students under the provisions of section 6 of the law of 1890. This provision for those unable to attend a dental college should, I submit, be guarded by some such examination as suggested, so that those too indolent or incompetent to pursue any calling requiring industry and skill shall not find refuge in our profession, and injure by their blunders the standing of all. The ordinary English branches are necessary as mental tools, without which but imperfect progress, if any, can be made, and to require a fair knowledge of them to be disclosed is sure to be of benefit to the student, the profession, and the public. Such requirement would have a two-fold influence for good. While excluding the utterly incompetent, it would also stimulate the brightest and best students to increased preliminary study and acquisition of knowledge.

"The legislature at the last session enacted an amendment to the ninth section of our law of 1890, the effect of which is to prevent any further assumption of the functions of the dentist by amateurs or charlatans, and limiting the operations of dentistry to those of assured skill and responsible position,—the regular dentist and the licensed physician or surgeon. The lawmakers of New Jersey deserve well from this society; they have invariably answered our requests with prompt and wise compliance.

"Trusting this assembly of our society may be wise and harmonious, I invite you to proceed with its business, expressing, in conclusion, the hope which springs from your kindness to me and our old personal friendship and regard, that we may all keenly enjoy the present association, and that your futures, one and all, may be void of sorrows and full of health and love and light."

Vice-President Holbrook. Gentlemen, this address is before you for discussion or action.

Dr. Sanger. Reference was made in the address to our new dental law. We have reason to be proud that our state legislature has met us half-way in all the steps we have taken pertaining to the proper government of our profession in this state. I am glad that our president has called attention to this matter, and I hope that we will not go away from this meeting and forget the fact that the work is only half done, and that the remainder lies with us as members of the State Dental Society.

Dr. Meeker. Mr. Chairman, while I agree in all the sentiments expressed in the president's address, the point that struck me most forcibly was that in regard to the membership committee. I am sure that if proper action be taken, as suggested in the address, in regard to applicants for membership in the society and for the beneficiary studentships in the colleges, which are at our disposal, it will result to the benefit both of the students that go to the colleges from this society and to the members that come in hereafter.

Dr. G. Carleton Brown. There are a number of suggestions in the paper which, it seems to me, should receive more careful consideration than can be given them at this time, and I would therefore move that the paper as a whole be referred to a committee of three, they to report later in the session upon the advisability of putting in force the suggestions made therein.

Carried.

Dr. George A. Maxfield then read a paper entitled "Methods of Destroying Dental Pulps," which is printed in full at page 870 of the current number.

The President. The discussion will be opened by Dr. Leon Goble, of Princeton.

Dr. Leon Goble. I wish to thank Dr. Maxfield for this excellent paper, not so much because it presents anything new or strange, but because it emphasizes what I consider a better way. We are prone to fall into ruts, and do things in the old way simply because it is the old way, and we need to be stirred up so that we may accept and try new methods. I more readily acquiesce in the views set forth in this paper, because I have verified in my own practice the statements which Dr. Maxfield has made. The first time I saw a pulp removed in connection with the application of cocain was several years ago in Philadelphia. Since then I have removed quite a number in the same way ; among them was a typical case, a left central incisor, broken off half-way from the cutting-edge to the gum. An eighth of an inch of the pulp was exposed, and as the young man reached my office two or three days after the accident, the pulp was in an exceedingly inflamed and painful condition. I proceeded as Dr. Maxfield has indicated, except that I moistened the crystals of cocain in tepid water. I succeeded in removing the pulp without a particle of pain.

In regard to the use of arsenic for the destruction of pulps, I agree with what the essayist has said, and will even go further and say that there are many cases in which the pulp cannot be destroyed with arsenic ; cases in which the vitality of the pulp is so low, or its diseased conditions so high, that the more arsenic you apply the worse you are off. I have, after applying arsenic in this way, removed the part of the pulp which was destroyed by contact with the arsenic, and afterward treated the remaining portion and capped it, and had it remain perfectly well and comfortable.

Now, I wish to approach the subject from a different standpoint. I believe the best way of destroying the dental pulp is in most cases not to destroy it at all. Two or three years ago, while Dr. Thomas, of Philadelphia, was reading a paper before this society, a gentleman in the adjoining room, during the discussion, a gentleman from the broad and breezy West, said, half in earnest and half in derision, "You Eastern dentists are a set of gas-bags, given to the indiscriminate extraction of teeth." I think that any one who looks over the dental literature for two or three years past, or listens to the papers read before our societies, might very naturally fall into the error of assuming that we were given up to the destruction of the innocent. "The best way of destroying the dental pulp with cocain"; "the best way of destroying the dental pulp with arsenic"; "the best way of treating teeth, the pulp having been destroyed;" and a host of other papers of the same kind. All this might well lead one to suppose that the only thing we thought about was how to kill the poor thing and get rid of it. I would be very sorry to destroy the pulp of every tooth that had ached. I have not been able in all cases to pass even a No. 5 Donaldson broach to the apex of a crooked root, and be sure I have filled it; but I presume every man practices that which he is the most skillful in, and as for myself I cap one hundred pulps where I destroy one. I don't want to have my patients avoid biting on a tooth because it don't feel good, or transferring hot coffee to the opposite side of the mouth becauses it raises an earthquake, or conscious of a storm two days in advance of it by means of their mouth barometer. I prefer live teeth; and I submit that the best way to destroy the pulp is to destroy the knowledge, on the part of the patient, that he has one.

Dr. Alonzo Boice, Philadelphia. There is a point or two on which I may take exception to the essayist. Before I left Philadelphia last evening I visited ten drug-stores for the purpose of getting some arsenious acid. I tried to get Squibb's arsenious acid, but I failed to get it in Philadelphia, in some of the best drug-stores in that city. I procured some arsenic, which I have here, and I would like to pass it around for your inspection. The arsenious acid that is purchased at the ordinary drug-stores excites the pulp, and will produce pain such as has been described in the paper; but a proper preparation of arsenious acid, properly applied, gives no pain. The application of arsenious acid to a tooth where the pulp is exposed and aching will certainly cause pain, but if you apply a little sulfate of morphia and let it remain for a few hours, then syringe the tooth with water until you can throw a jet of water upon it without the patient knowing it, arsenious acid, properly applied, will cause pain in but very few cases, and then not longer than ten or fifteen minutes. The most difficult cases are teeth that have been filled, especially those that have been filled with phosphate of zinc.

An old personal friend, to whom I spoke about applying arsenic and cocain, told me to take the arsenic and grind it as long as I could, then grind it again the next day, before putting it in a tooth. That was my friend Professor Flagg. It is an astonishing fact that you cannot buy arsenic fit for dental uses. I wish you would take these different bottles and examine the contents. You will find it is not pulverized arsenic. There is the probe [instrument shown] that I have used for applying arsenic to the pulp. You can stick that probe through your hand without being hurt. You can poke it down a sixteenth of an inch in the pulp, then seal it up and let the patient go away without discomfort. When I asked how much arsenic one should use in a tooth, my friend said he didn't know you could get the quantity small enough ; something like one-fifteen-thousandth of a grain. It is a question of the smallest amount that you can get to the pulp. I think you will find that pain will not be produced if this method is followed ; and if pain is developed it should not last more than ten or fifteen minutes.

Dr. J. Foster Flagg, Philadelphia. Up to the present time, after an experience of eight or nine years in the use of cocain in connection with arsenic, and of cocain as a substitute for arsenic, it seems to me that Spooner is the man that is on top, and arsenic is the material for the devitalization of pulps, if it is to be a material. It is with me exceedingly seldom that there is more than a few minutes' pain from the application of arsenic. We have various mixtures,—arsenious oxid and acetate of morphia, arsenious oxid and iodoform, arsenious oxid and menthol, and arsenious oxid and antipyrin. My experience is diametrically opposed to that of my Connecticut friend, who says he always wants to make the application of arsenic directly to the pulp. In some cases the application should be made as far from the pulp as possible, and sometimes it should be made as closely upon the pulp as possible. It depends on the temperament of the patient. If the patient is of a lymphatic temperament, the application may be made directly to the pulp, and the operation will be painless. On the other hand, if the patient is of a nervous temperament, and therefore eminently perceptive of pain, the application of arsenic immediately upon the pulp is liable to be exceedingly painful. We recognize the fact that it is an obtunder of sensitive dentine, and it has been the common acceptation that its application, although marvelous in its goodness in obtunding sensitive dentine, should be used in connection with sensitive dentine only if the pulp is to be destroyed, and we always find that the pain is so little that the pulp dies a quiet death. It works its way into the dentinal structure, and will, in the course of time, devitalize the pulp, and there is very little pain attending the process. But that arsenic, the medicine *par excellence* for destroying the pulp, should be set aside does not accord with my experience. I would say furthermore, as our friend in opening the discussion said, in a semi-satiric way, that there is nothing new in the paper. No matter what is brought up, they tell us it is not new, that almost everybody has used it. Now, I would like to ask you whether there has been much practice in the devitalization and extirpation of dental pulps with the dental helix. It may be that in ten or fifteen or twenty years from now I will have the pleasure of coming before you with a paper on the devitalization and extirpation of dental pulps with the dental helix. It has been tested during the last five or six years in an experimental way. I have had it tested in my own person three or four times, and I have used it in about thirty or forty cases. The application which is eminently successful in obtunding dentine, is also eminently successful in the devitalization and extirpation of the dental pulp.

Dr. S. C. G. Watkins. I abandoned the use of morphia, in connection with arsenic, four or five years ago ; I was not satisfied with the way it operated, and I adopted the use of cocain with arsenic ; grinding together equal parts of arsenic and crystals of cocain, then adding sufficient carbolic acid to form a paste. In cases where there is no congestion of the pulp, there will be no pain from the use of this mixture. I can apply it immediately upon the pulp, and feel assured, I think in every case, that there will not be pain following. I do not recall a single case of failure with this compound ; but when I used morphia and arsenic I frequently had trouble, and yet I am not so sure that the morphia was the cause of the pain, or rather that it would not have prevented pain sometimes, as cocain does, had I applied it properly. It is possible, in applying arsenic in connection with morphia, that there may have been congestion in the pulp at the time it was applied. Where there is congestion in the pulp, and you apply arsenic, there is sure to be pain following. In cases of congestion of the pulp it should be treated, and relieved, before the arsenic is applied. Of late years I have been very particular to relieve the pain and reduce the congestion before applying arsenic, and in such cases it has worked beauifully.

Dr. James Truman, Philadelphia. I did not intend, Mr. President, to say a word on this somewhat hackneyed theme, but it seems to me that the speakers have lost sight of the principal point in the essayist's paper, which, if I understood rightly, was the action of cocain on dental pulps. I have nothing to say in regard to that particular point, however, my experience in that direction having been limited ; but I was pleased with the after-treatment, the injection of chlorid of zinc into the canals for the purpose of coagulating the albumin that may be present. I think we have generally lost sight, in the treatment of pulp-canals, of the importance of coagulation as a preventive of future disturbance. I was particularly pleased with that portion of the essay, because it coincides with my own views in regard to that matter.

Some of the speakers have dwelt particularly upon arsenic as a pulp-destroyer. That is an old, old story, and I don't know that any of us are very much interested in it ; but there is one point in regard to it, at least in the remarks of the gentlemen who have spoken upon the paper, that I would like to refer to, and that point is, that pain is universal in congested pulps, and there seems to be no remedy for it. One dentist uses cocain combined with arsenic, another will use arsenic in combination with another agent, and some will use arsenic alone. Now they talk as though congestion was something that appears some time after the exposure of the pulp. When a pulp is exposed there is irritation, and irritation means an increased flow of blood to that particular part, and that means congestion, and from the very moment that a pulp is exposed congestion is present in that pulp ; therefore we have to meet this difficulty immediately, and I know very well, as you all know, that arsenic when applied to a congested pulp is resisted by the inflowing of blood and the increased blood-pressure, and the drug is not absorbed into the tissue. The arsenic then becomes simply an irritant upon the pulp. How are we to overcome that irritation and the consequent pressure? It is a question that has interested me for years, and I never found any agent equal to iodoform for this purpose, combined with the arsenic. I have found nothing superior to it for doing the work, even when the pulp is in a congested condition. It seems to me that we need to study more closely the pathology of these cases. Before we undertake to apply anything to the pulp let us know what we intend to do or expect to accomplish; let us understand the conditions that we have to meet in treating the cases spoken of by the essayist, and then perhaps we can apply the proper agent intelligently.

Dr. C. A. Brackett. I think a large part of our best success comes through the exercise of discrimination. I remember well that in my own student days, now nearly a quarter of a century past, an exposed pulp was an exposed pulp, and had prescribed for it routine treatment that was largely empirical for all kinds of exposure and with pulps in all conditions. I think there is cause for congratulation that we are getting at the question from the standpoint of the pathologist. We are now able to appreciate pathological conditions, the operation of irritants, the determination of blood to the part, the consequent congestion, and the establishment of inflammation, with other pathological conditions that may exist, such as hypertrophy, the tendency of the pulp to undergo fatty degeneration and be the seat of suppuration, of gangrene, and, possibly, of chronic hypertrophy,—all these various pathological expressions are now recognized and given treatment appropriate to the differing conditions. I think that in our greater appreciation of these various circumstances, and our greater knowledge of the treatment appropriate for the conditions, lies much of the progress that the last quarter of a century has witnessed in this direction.

Dr. Smith. The gentleman who opened the discussion made the statement that it was his custom to apply arsenic to an inflamed pulp, afterward remove a portion of the pulp, then cap the remainder, and fill. Did I understand the gentleman correctly?

Dr. Goble. Yes. I have done it a great many times.

Dr. Smith. I denounce it as false treatment. I don't believe the pulp lived three days after it. I don't believe it is possible. When once applied, the destructive effect of arsenic is almost inevitable.

Dr. J. E. Garretson, Philadelphia. Mr. President and gentlemen, I have no objection to telling anything I know, but I feel that I don't know anything on this subject that is not known by the gentlemen here assembled. There is a saying, very familiar to you, about an old doctor who said that when he was young he had twenty remedies for every disease, but when he was old he had scarcely one remedy for twenty diseases. As we go on in life, and get a wider experience in professional work, we resolve these things into absolute simplicity. No one could have heard the essay to which we have listened without recognizing the fact that the gentleman is in that very happy stage of professional life in which men are full of that glorious energy which pushes professional life forward, and I feel like congratulating and complimenting the gentleman. It is not exactly true that there is nothing new in what he is telling about. There are new things to all of us. We are constantly getting new ideas and new hints which may perhaps advance us in one direction or another, but all this great variety and complexity of ideas and opinions and methods ultimately resolves itself into great simplicity. I believe we should consider the temperament of the patient in administering cocain or any anesthetic. You can cut off the leg of a lymphatic person, and he does not make any complaint; but take a nervous man, and all the anesthetics we can use sometimes fail. I suppose the result of our experience is that we reach the idea of modifying our practice to suit the particular circumstances of the case in hand. It takes years to come to that. They tell us there is no short cut or royal road to learning, or what I would call the result of experience. We must all wind around, in and out, through the maze. In regard to dental practice, you learn that all these complicated methods of treatment are seldom necessary, and you instantaneously recognize the requirements of the different conditions,—that one patient is lymphatic, another semi-nervous, and yet another highly nervous, and that they require somewhat different treatment for the same troubles. We learn according to our experience, and all this diversity of knowledge is most valuable. I have enjoyed your meeting, and have profited by it perhaps more than some of these young men. When they shall have gone over the ground that men as old as myself and Dr. Flagg have gone over, they will finally come down to one or two simple expressions of practice. I don't know how the doctor could talk three days and a half on the treatment of the pulp. It seems to me that all I know about it I could tell in about two minutes and a half, and perhaps that means that I know very little about it; so I will admit the truth of it, and sit down and listen to what the rest of you have done.

Dr. Maxfield. When I left college it was with a strong belief in my mind that every pulp should be saved, and that was my endeavor. It was not until I had made failure after failure that I came to the conclusion that pulps that had given trouble would give trouble after the teeth were filled. There is a great deal to be considered in regard to what causes pain in the pulp. There are systemic causes, besides the local, at times. Oftentimes I have found a remedy for the pain in the administration of antipyrin, five-grain powders.

Professor Truman spoke of congestion, and of using iodoform in such cases. I think the pain that we first meet with in the pulp comes because there is congestion. Sometimes, if you can relieve the pressure upon an exposed pulp the pain will cease. We often get congestion after the application of arsenic, and that is why I say I always want the pulp exposed before I apply the arsenic. I want room for the swelling that follows, so that there will not be pressure upon the nerves of the pulp.

As to using iodoform, it was my stand-by, and I wanted to use it in every case where I could. I think my preparation of arsenic was made from Professor Truman's formula. I did not get much better results from that than I got before. I came to the conclusion that the use of morphia did not help the pain caused by the application of arsenic, and for several years I used arsenic combined with iodoform. I suppose you have all had the experience that sometimes arsenic does not do its work. Perhaps we are able to remove a portion of the pulp, the body of the pulp, but not that part in the root-canals; but if you will take a hypodermic syringe and inject cocain, you will be astonished at the result; you can remove the pulp without pain. Only a short time ago a lady came to me from another dentist who had attempted to enter the root-canals in one of her teeth, and the operation was so painful that she left him and came to me. I injected a four per cent. solution of cocain and removed the remaining pulp-tissue at once. The next time I met my dental friend I told him about the case, and he has practiced my method ever since.

Oftentimes you get inflammation after the removal of the pulp, perhaps from shock. In such cases I give the patient some capsicum plasters to apply to the gum.

Dr. Henry Burchard, of Philadelphia, read a paper, of which the following is an abstract, entitled,—

SCIENCE AND PSEUDO-SCIENCE.

It is not unfitting, in the proceedings of any scientific society, that such a sketch as this be made to serve as a warning that "all is not gold that glitters," and that anything or any matter which has continued usefulness is the outcome of rational observations and trained thinking.

Wrinkles and expedients are the things much needed, and most shown at dental society meetings as applicable novelties.

No one doubts the good judgment evinced in this choice, but the claims of the *science of dentistry* are neither to be ignored nor treated lightly; and there is a disposition to relegate this aspect of our calling to a second place.

The science—if science we make it—is the foundation upon which a series of structures, known as systems of practice, are built; these are to endure or perish as they are firmly or loosely resting upon their bases. A practice not founded upon a scientific basis is built upon sand. Constructed upon a rational foundation, it may be modified to any extent; but destroyed, never.

The fact that fads, fancies, and fallacies are being constantly presented to our attention has led to this somewhat loose and incoherent *résumé* of the history of irrational thinking.

As a part of the scientific body, we do suffer, and have suffered; and if we are to gauge our expectations by a not inconsiderable part of dental history of the present, we have much to endure yet before a Stomatological Utopia is to exist.

The literature of all times and all peoples furnishes us with an abundance of aphorisms, proverbs, and epigrams of the learned; all of them pointing out how long, trying, and difficult to travel is the road to the acquisition of learning and wisdom. Despite such records and experiences, mankind has ever sought, and perhaps will ever seek, a philosopher's stone, in the shape of some short cut to the same end. We may call it "seeking a royal road to knowledge."

How much these by-path excursions have, item by item, added to the sum-total of human wisdom every science bears witness; and how much of the straight road they have lost in these side wanderings, some four thousand years of records will testify.

With many or most of the inquirers, searchers of the past eras, the accidental discoveries of certain constant associations between groups of phenomena have been but dry details, which are to serve as stepping-stones to the finding of a Solomon's seal; which, ultimately, is to solve the mystery of the great unknown. No matter what practical results may be achieved, they are naught. The metaphysician holds as beneath him the groveling methods of detail search, and the ultimate is his goal.

This spirit tinged the intellectual processes of the learned in all civilized countries and among all cultured people. By it the priests of Brahma gave us a bewildering synthesis, after a profound analysis. The followers of the Egyptian gods had, to their own apparent satisfaction, attained all that man possessed the capability of securing.

Men, even in this age of evolution, accepting as literal truth the Hebrew chronicle, have persuaded themselves that the priests of the inner temple of Isis had, in their persons, superhuman faculties; and we find among our own people classes in which the superstitious spirit is so developed that vagaries so wild that even Bulwer would hesitate to base a story upon them, are accepted as truth.

Some irrational belief in the occult appears to be a necessity with some classes, for we see how theosophy gathers victims and shekels among the credulous everywhere. Even ghosts have a commercial value, for the medium grows as sleek and impudent as his lay figures.

The experiences of thinkers and workers of the past are positive evidence that every department of learning has been built piece by piece. That part of this endures which the common experience of the educated has demonstrated to be a constant association of individual elements, a sequence of phenomena known to science as cause and effect.

It is by noting and recording these sequences that science has acquired its present proportions. It was Tyndall, I believe, who wrote an essay upon the scientific use of the imagination. With this geniuses achieve wonders; but with those of meaner caliber the result is an acrostic.

No science, no art, no system or method of philosophy, which we regard as sound, that has not been the fruit of the application of the laborious but safe Aristotelian method of formulation, it being in truth the method of demonstration. Good generalizations result only after prolonged and exhaustive induction has led the way.

Those without such history, and which have been used as an *a priori* basis for and of deduction, have been subjected to destructive change or annihilation.

Where can an exception to this be found? The four greatest theories in all the history of science, the law of gravitation, the laws of evolution, the nebular hypothesis (in reality a part of the former), and the laws of the conservation of energy and the persistence of force, will all bear witness to the worth of the inductive method. Which of these was formed as a hypothesis until a tremendous array of data furnished a sound basis for speculation and reasoning?

In the face of such evidence as this, there is a never-ending crop of counterfeits, known as pseudo-scientists (really believing in themselves), rising like mushrooms with full-blown theories for heads, —unlike the mushroom in this respect, however, that many of their theories do not hold water. The resemblance is restored by the fact that most of their substance is not solid. Too frequently the analogy is worse : they are scientific toadstools. A dangerous intellectual diet are these latter fungoid growths to the unwary inquirer who devours them. Apparently nothing but an innocent puff-ball, but the victim has swallowed, as regards science, a dose of muscarin.

Aside from the half rational object of the alchemist (and respect for material achievement prevents too sweeping a denunciation of those worthies), there are two fallacies which have received astonishing following : one a fallacy pure and simple ; the other a true pseudo-science, the tool of the charlatan and the pursuit of the ignorant.

The fallacy, it is scarcely necessary to state, is the formula of Hahnemann, the *similia similibus curantur.*

For the purpose which the teaching of the father of homœopathy has served, it is doubtful whether to term his doctrine a mischievous or an extremely useful one.

The medicine and surgery practiced by his contemporaries was more than one-half irrational and ill-founded, so it is perhaps this fact which permitted the introduction and adoption of Hahnemann's fallacy.

How many elements were and are at work to maintain a sickly existence for the homœopathic dogma we know. They and their ramifications are so numerous that extirpation is not possible without furnishing the public at large with more rational ideas concerning the healing art than are now possessed by it.

The doctrine, such as it is, has served one good purpose at least : that is, a demonstration to good observers of the fact that much of disease is self-limited ; further, that interference with the processes of nature without well-founded cause or reason does more harm than good.

These facts, taught, unknown to themselves, by the high priests of potentialities, are the ones which will eventually overthrow their teachers.

For the thing itself, it is a hasty generalization founded upon insufficient data and mistaken premises.

As a type, it has many relatives. The variety of mind which has accepted and does accept it is equally open for the embracing of other speculative matters of like description.

Some of these are termed "occult" by their misguided followers, and by other titles ranging around it, all having like significance.

Their reasoning is better and more truly defined as pseudo-scientific, or irrational induction and deduction.

The pseudo-science to which allusion has been made, and which has been selected as a representative, is the one which has formed the means by which charlatans have preyed upon the vanity and ignorance of a not inconsiderable number.

It is the mass of absurd rubbish known as phrenology.

No doubt when Gall bred the original anatomico-physiologico-psychological bee in his bonnet, he mistook the buzzing of that insect for the huzzas of approbation which should greet the enunciation of his theories ; and, in a measure, he did secure a following. His bee begot others, and although one of the progeny made honey, those of to-day are a feeble colony of drones. So sickly a hive do they form that it is not worth the while to smoke them out.

Probably the modern localization of cerebral function has been the product of the evolution of Gall's original idea.

Glancing over the history of this and other pseudo-sciences, and noting the following they have had among people who have some claims to intelligence, one is struck by this fact: that although pseudo-sciences are eventually made to yield at least a modicum of truth, they misdirect an incalculable amount of energy before the accomplishment of that end.

If an equal amount of intelligence and industry were applied to purely rational investigation, general science and the practical interests of humanity would be gainers.

The unrecognized parent of phrenology, another branch of knowledge which is in reality becoming more of a true science than we are at first willing to concede, is physiognomy. It is something to which are applied recognized or probable laws of cause and effect; a pseudo-science, if we apply the title to a reading of character by the shape of the ear-lobe or the number of hairs in a beard, and kindred data.

Certain phases of it have been for a hundred years inextricably bound up with the pseudo-science, phrenology.

Fortunately for the fate of it, investigations of our own time are stripping from it its fallacy and the hasty conclusions of the half-educated, and there is left much of undeniable fact.

It is being placed in its proper position, as a branch of ethnology and anthropology.

Its close association with ethical matters lends an additional interest to it.

It is perhaps invidious to make a sweeping condemnation of certain written works upon physiognomy, as the believers have easily wounded sensibilities, and many of the deluded followers are very much in earnest.

The scientific capabilities of the subject may be seen in such works as Charles Darwin's "Expression of the Emotions," and Mantegazza's "Physiognomy," and Bell's book. The dangerous, alluring, and inexact side of the matter is represented in Lavater, and the queer volumes of Fowler & Wells.

Although works such as Della Porta's are of service to artists, for the purpose of science they are to be taken *cum grano salis* (*magno grano*).

Professions and sciences have their various courts of appeal and of test. Unfortunately for dentistry, sound judgments are passed beyond recognized courts. Individuals and their personal experiences decide matters independently of organized bodies, and the digest is a purely personal one. Fallacies and false theories may thus ride rampant, to the confusion of the uneducated and the amusement or disgust of others.

We all recognize our own calling to be one governed by the laws of general and special science, so that in the path marked by these we travel safely. Aside from them we are lost in the wilderness.

Logic grants to medicine, our mother science, some latitude of deduction before throwing the latter from its realm.

The extent of this latitude, although not definitely marked, we can gauge; and yet who is there so unobservant as not to note how dental practitioners stray away from the straight road into inconsistencies, puerilities, and shallow reasoning. Neglecting their guide-posts, they frequently make grotesque application of some fragment of general science.

The examples are so numerous that a list would make an essay too lengthy ; but this may be stated : Were the engineer, the physician, or lawyer to use, as inaccurately as do many dentists, the stores of knowledge upon which practice is based, there would result broken bridges, wrecked ships, dead patients, and lost cases innumerable.

What we term the strictly practical dentist is strikingly free from such stigma, meaning by the practical dentist that purely American creation, the man of unsurpassable manual dexterity and fertility of resource, who recognizes that his work is nine-tenths mechanical, and so goes the way he feels to be safe.

Praise be to good fortune he feels as he does, for his additions to the records of dentistry are of inestimable value.

A distinguishing feature of science and scientists is modesty, coupled with a profound respect for everything of the nature of evidence, and a courtesy as to the opinions of others. Being slow to form conclusions, therefore generalizations are the fruit of much thought and many, very many, data.

Self-assurance and egotism form no part of the scientist's personality.

On the other hand, the blatant, patronizing self-assertiveness of the insufficiently educated marks the creature as one who but rubs the sides of the, to him, locked book of science.

He is many and ubiquitous, amusing and dangerous, and, too often, unprincipled.

Of pseudo-sciences and their followers, the marks are loud pretension, intolerance of doubt, and a facility for formulating theories upon shreds of evidence.

Their theories are made and unmade with kaleidoscopic quickness and effect ; but, alas ! we see in the end but colored glass, broken bottles, and gems are as hard to find as ever.

The stigma should be attached to the individual—and his name is legion—who strives to make a smattering of scientific knowledge do service for the lack of manual dexterity.

He is numerous, and to the initiated not hard to distinguish, so avoidance is as easy to the wary as contact or following is dangerous to the heedless.

He pops up in unlikely places, and for a time escapes detection and exposure ; but, soon or late, he and his doctrines are relegated to a shelf of the dental junk-shop, and exist then only as curiosities.

Discussion.

Dr. Garretson. Mr. President, I am always interested in what my young friend and former student does and says. This paper is philosophical in its nature, and I cannot dwell upon it otherwise than philosophically. I would emphasize the importance of principles, principles, principles. There is a saying that is familiar to every person here, because it has lasted two thousand years, the words of Plato in the mouth of Socrates : "All that I know is that I know nothing." These words are everlastingly running through my brain ; I cannot get clear of them. Also another saying that has come down to us : "The beginning of knowledge is to know that we know what we know, and that we do not know what we do not know." I have an acquaintance in Philadelphia, a bright man, one of the most learned men within that city, and some time ago I said to him, "Mr. H., you seem to have lost your voice ; I remember you in your younger days when you were full of enthusiasm, reading papers and discussing them, while now you are silent. Why the change?" He said, "Doctor, I have discovered that I know nothing ; I find myself unable to speak, from the fact of my apprehension of the nothingness of my knowledge." Now, I don't know where the voice came from, but while my friend was reading his paper, I heard a voice saying, "What is that fellow reading about?" I can very readily understand that. The voice sounded like the voice of a young gentleman, not the voice of age. I have no doubt but that young gentleman came here and got ideas which he has not grown up to ; I have no doubt that the paper read by the essayist was to that man a sublime poem. Not that he learned very much from it, but in the course of years he will listen with respect to gentlemen who may have a little wider information or a longer experience. These things are the pillars that mark our advance. And yet, perhaps, he could criticise me twenty-five times where I could criticise him once.

I recognize this fact, that my young friend who asked "What is that fellow reading about?" wants details. The gentleman does not know it, perhaps, but he is an Aristotelian ; he wants to proceed by induction ; he finds himself led from one fact to another fact. He who learns one thing is led by the knowledge and appreciation of it to another thing ; and so you go on, step by step. Knowledge does not stop ; there is nothing in the world which is not within the reach and appreciation of the man who studies by the inductive method. So in regard to the treatment of the dental pulp ; the question resolves itself into such simplicity that I said I could tell you everything I knew about it in about two minutes. I have been sixty years in coming to be able to tell people this. Am I not able to appreciate to the fulness the remark of my friend when he said, "What is that fellow reading about?" He will get beyond that if he goes on, and I hope he will live to come before a company like this and say, not "What is that fellow reading about?" but "What glorious things that fellow is reading about!" Principles, gentlemen, principles! I hold to the old aphorism that, so far as I know, so far as I have gotten, the beginning of knowledge is to know that you know what you know, and that you do not know what you do not know. There is an article in the admirable DENTAL COSMOS that struck me as showing how true it is that we don't know what we don't know. There is no subject in the whole category of dental therapeutics and surgery that offers a better illustration than pyorrhea alveolaris. Pardon me for saying that if the man who wants to understand principles will go home and take up that chapter on pyorrhea alveolaris, he will find such a chapter of nonsense that he will acknowledge the truth of what I am trying to talk about.

Dr. Brackett. Mr. President and gentlemen, after the eloquent and learned remarks to which we have listened with so much pleasure and profit, I certainly will have few words to say with reference to the paper. It seems to me that the error that many of us have made, and that many organizations and schools make, is largely in trying to build too large a superstructure upon a narrow foundation. The one thing in the paper that comes to my mind in a way not quite acceptable, was the unqualified and positive condemnation of certain principles, or pseudo-principles, or partial fallacies, that a portion of humanity has accepted. I am not a homœopathist. I do not believe, as an individual expressing my own personal ideas, that the doctrines of the homœopaths are sufficiently broad and comprehensive to build a whole system of healing upon. I do believe that within homœopathy there is contained some truth. I also believe that in various other schools or methods which occupy public attention, and various other doctrines which are made the foundations of systems of the healing art, there is an element of truth; and this, I think, is a legitimate criticism to make of homœopathy and various other exclusive systems of medical practice, that they are not built on sufficiently broad foundations. On the other hand, I think every one would find in these doctrines an element of truth, something that may be possibly helpful in certain cases ; not sufficient to build up a whole system of medical practice upon, but containing something that is not to be absolutely, utterly, and unqualifiedly condemned as error, as wrong, as fallacy, as fooling the world ; so I wish to indorse most cordially the eloquent and truthful remarks, as it seems to me, of the able and experienced gentleman who preceded me, that we should be moderate in our wholesale condemnation of that which may contain an element of truth, helpful to us and helpful to humanity, if it is discriminately appreciated, separated from error and judiciously applied.

Dr. James Truman. If I understand it, all science is absolute truth, and that may be found in various branches that the essayist has alluded to. It may be phrenology, it may be the occult, it may be homœopathy, it may be, possibly, in general medicine, and he left that out as one of the pseudo-sciences. I myself do not like this wholesale denunciation of other people and other ways of thinking. I recognize that we have in all these different thoughts of the world something to look after. There must be a germ of truth in everything, or else it would not exist; and it is our business, while passing along in the world, to endeavor to find that germ of truth and cultivate it, and, if possible, make it our own.

Dr. Burchard. Mr. President and gentlemen, I am afraid that Dr. Brackett and Dr. Truman have slightly misapprehended the spirit of my paper. As to condemnation of anything, I believe I said explicitly that in every pseudo-science, or by-path for knowledge, we would sooner or later find a modicum of truth. I only condemn the misdirecting of energy in the acquisition of the knowledge pertaining to medicine, or any other profession in which, by a process of rational induction, we may arrive at truth. I am afraid that Dr. Brackett interpreted my remarks into a statement that there was no truth in homœopathy. I believe I said there was great truth in homœopathy ; that it had done great service to the world. Science belongs to logic. Logic is the last criterion of all.

(To be continued.)

AMERICAN DENTAL ASSOCIATION.

(Continued from page 801.)

THIRD DAY—*Morning Session.*

THE association was called to order at 10 o'clock A.M.; President Patterson in the chair.

The chair announced the appointment of several committees, before reported, as follows: Committee on the history of the census classification of 1890, committee on the unification of state laws, and committee on nomenclature.

The action leading to the appointment of the committee (before reported) to confer with the Southern Dental Association as to the feasibility of forming one national association, was taken.

Several sections were called and passed temporarily.

Section VI, Physiology and Etiology, was called, and the chairman, Dr. H. A. Smith, of Cincinnati, read the report, which announced two papers, respectively by Dr. S. B. Palmer, of Syracuse, N. Y., on the "Etiology of Dental Caries;" and by Dr. J. J. R. Patrick, of Belleville, Ill., comprising the final report of the committee on examination of human crania in museums of the United States, the latter to be read by title, as illness had prevented Dr. Patrick from preparing the report which, however, he expected to have ready to be printed with the official Transactions.

The report also gave a condensed statement of the views enounced by Dr. C. N. Peirce, of Philadelphia, as to the uric acid (constitutional) origin of pyorrhea alveolaris, and of the reply by Dr. G. V. Black, of Jacksonville, Ill., maintaining that the cause of the disease is local, with both of which the readers of the DENTAL COSMOS are familiar. A pamphlet by Dr. J. E. Cravens, of Indianapolis, on pyorrhea alveolaris, in which the theory was advanced that the source of the peculiar elements found in the deeper pocket calculus of the disease was to be found in the pus itself, was next reviewed. Dr. Cravens believed the concretion to be the result of inflammation, which, beginning at the gingival border, progresses toward the apex of the root-pockets, being found at any place within the socket of the tooth where the inflammation has reached the suppurative stage. Dr. Cravens was quite positive that there were no so-called blind pockets; that for every one there was a means of ingress from the gingival line, as well as a necessary means of drainage at the gingival line, and that it ought to be discovered.

The report closed with a commendatory review of the third edition of Dr. Eugene S. Talbot's "Etiology of the Osseous Deformities of the Head, Face, Jaws, and Teeth."

Dr. Stewart B. Palmer, Syracuse, N. Y., read his paper, entitled "Etiology of Dental Caries." *

The subject of pyorrhea alveolaris was then discussed till the hour of adjournment, as reported last month.

The special session in the afternoon, for the consideration of the report of the committee on revising the constitution, was reported in our September number.

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* See page 862, current issue.

Evening Session.

The association was called to order at 8.30 P.M.; President Patterson in the chair.

The paper read by Dr. Palmer at the morning session was taken up for discussion.

Dr. Frank Abbott, New York, said that so far as the electro-chemical theory of caries was concerned, he had nothing special to add to what he had already said upon the subject. He was on record many years ago upon the points discussed, and he saw no reason to change his view that caries is an inflammatory disease. What he wanted to do was to call particular attention to a manner of filling root-canals, which he had described in the *International Dental Journal* for August, 1893. For many years he had tried the usual methods, involving the thorough drying of the canals, but some three or four years ago he gave up such methods, and has not since attempted to dry the canal. He now advocates the use of aqueous solutions of bichlorid of mercury in the treatment of root-canals, for it cleanses them more thoroughly than anything else he has tried. The results with oily preparations were not satisfactory with him, so he adopted the aqueous solution entirely, 1 to 10,000, which is forced into the canal with a syringe after the contents are stirred and removed, as far as possible, with instruments. The stirring and washing are repeated until the operator is satisfied that the canals are clean. The moment this is completed, a little bit of cotton is carried to the end of the canal and packed tightly, to plug the foramen, without drying, and the filling-material, oxychlorid of zinc, is immediately inserted, the idea being to allow the antiseptic remaining to mix with the filling-material, and thus continue permanently in the canal. In the paper referred to he had said that he did not fill while there was any periosteal inflammation. Since that was written, he had practiced immediate root-filling a good many times. It was his practice many years ago to treat these teeth considerably before filling the root-canals, but the immediate method is better. In filling in this way, you shut off the ingress of everything that would irritate the tissues, which is of the first importance. He had recently filled a canal where there was a formation like a cyst at the end of the tooth-root, and in less than a week's time had had the cyst disappear, simply by shutting up the canal and applying counter-irritants to the gum. He thought it well that dentists should know the important saving of time, both to their patients and to themselves, that can be made by filling roots at once.

Dr. J. Y. Crawford, Nashville, Tenn., asked Dr. Abbott how he distinguished between the two inflammatory conditions—the pus-sac and the indurated or semi-fibrous cyst.

Dr. Abbott knew of no way of ascertaining without the use of the exploring needle, so he takes the formation to be a pus-sac, as a rule. There is evidently some sort of absorption under the treatment outlined, but whether there is fatty degeneration first and absorption afterward, he could not say. All he knows is that he has destroyed the abscess in the way he had mentioned.

Dr. John S. Marshall, Chicago, said that he was a neighbor of Dr. Palmer's at the time he first announced the electro-chemical theory, and he saw him go over the experiments which created such a furore in the profession. We have heard harsh things said about the views advocated by Dr. Palmer, but the ideas he had advanced have changed dental practice. How many were there who lined cavities with tin before the appearance of his paper? how many thought of saving teeth in which secondary decay had been set up? All honor to Dr. Palmer for the good work he has done. Dr. Palmer could show, as he had shown to him, that the foods we eat are in pairs electrically, one positive and the other negative, and this, he claimed, was the cause of a higher zest in their eating. Thus, ham and eggs, turkey and cranberry sauce, are pairs of this sort. So Dr. Palmer arrived at the conclusion that all matter stands in that relation, either positive or negative. If those present would go over the experiments which Dr. Palmer has suggested, the speaker felt confident that they would get some of the results that he does.

Dr. A. W. Harlan, Chicago, stated that after Dr. Palmer had read his paper before the section, he himself had read it in quiet. Just what relation the filling of roots has to the etiology of caries he cannot see, but he would ask Dr. Palmer how an essential oil can become oxidized in the root of a tooth, and how it is that, if gutta-percha is oxidizable, it is used for covering the Atlantic cables, which are laid in the water. This is not the proper time for discussing the filling of roots, but he would say that the best material known for that purpose is gutta-percha. It is one of the unalterable substances which can be placed in a root-canal without danger of its becoming disorganized. With reference to the lining of cavities with tin, the honor of that suggestion does not lie with Dr. Palmer. The late Dr. F. P. Abbot, of Berlin, Germany, used that device twenty-five years before Dr. Palmer's paper was read; and Dr. Westcott and others used tin in the bottom of certain classes of cavities thirty years ago. So that is not an original idea with Dr. Palmer.

With reference to the main subject of the paper, the electro-chemical theory of decay, as stated by Dr. Palmer, is a continuation of the experiments of Bridgman in 1834. At present, with the published investigations of Miller and Black before us, the electro-chemical theory has no ground to rest upon. Their present conclusions may be modified by future discoveries, but it seems absolutely determined that decay is the result of micro-organisms through their excretory products. He does not say this to belittle Dr. Palmer or his work, but the electro-chemical theory is "not proven," and Miller's conclusions must stand until something more definite can be demonstrated before scientific bodies.

Dr. Marshall. Dr. Palmer does not antagonize Miller's theory of decay in the paper read this morning. He talks rather about secondary decay. He is talking also about low-grade teeth, in which the loss of gold fillings cannot usually be explained, so that faulty manipulation has been set up as a scapegoat. Dr. Palmer maintains that in these cases a battery is set up which destroys the tooth-substance around the filling, and that its loss is not by any means to be attributed to faulty manipulation. He would venture to say that there is not one operator in the room who does not have patients coming back after two or three years with fillings which were properly put in and which are being lost by secondary decay. Dr. Palmer undertakes to say how some, not all, of these failures occur. He did not say that Dr. Palmer was the first to use tin as a lining for cavities; but he was the first to give a scientific explanation of the value of the plan.

Dr. Harlan replied that to prevent any misconstruction of his remarks he would say that the causes which produced decay in the first instance will produce it in the second. If microbes caused the first, original decay, then microbes would cause the secondary trouble. Gold is inert, a foreign body, and unchangeable, and cannot cause the secondary decay.

Dr. Crawford. Which pole in a battery attracts the acids, and which the alkalies? It has been intimated, and experts have said that one pole attracts acids and the other alkalies. If we could pass medicinal agents by electricity, why not pass agents which are otherwise than medicinal? If it is true that one pole has a tendency to accumulate acids and the other alkalies, there may be more in the electro-chemical theory than we have admitted. He thinks with Dr. Harlan that primary and secondary decay are one and the same, but the factors which produce them may differ. If there is an electrical influence which has a tendency to accumulate the acids extracted from foods at one point in the mouth and alkalies at another, it may have a bearing on the behavior of different filling-materials. He wanted to prophesy that the aggregate results of practice will yet convince the dental profession that the introduction of amalgam will do more harm to the human race than anything else for which the dentists are responsible.

Dr. Louis Jack, Philadelphia, wished to say a few words in explanation of his inability to understand how the electro-chemical theory explains the decay which sometimes recurs around fillings. If that theory were true, it would seem that all portions of the margins should be influenced as well as the cervical; whereas, we find that in the majority of instances the decay recurs at the cervical margins only. Black and Miller explain quite clearly why the recurrence is at the cervical margin and not elsewhere, which is why he holds fast to their views.

Dr. Abbott finds himself unable to understand one point. If a filling is equally well put in in every part, how is it possible for any destructive agent to enter at any particular point? He claims that these failures are all due to defective manipulation, as it is well known that the cervical portion of the filling is the most difficult to insert properly. He cannot conceive of the presence of micro-organisms there rather than anywhere else. To produce decay there must be something that will dissolve the lime-salts in order to start the decay. This is naturally an acid; you may produce it by electricity, or by fruits, or by medicines, or how you like, it makes no difference. Dr. Palmer has a theory that when a tooth is overmalleted, the tooth is broken down and so offers an opportunity for decay to be set up, the crumbling portion being added to continually by the effect of the electrical current set up in the mouth, between the filling and the tooth-substance. Dr. Abbott was not willing to deny this at all, as there may be a great deal in it.

Dr. Palmer did not care to say much upon the subject in addition to what was presented in the paper, which was not written to antagonize the fermentative theory of dental decay, because he himself believes in that theory. Differences often come from misunderstanding. Dr. Miller, some sixteen or seventeen years ago, did the most harm to the electro-chemical theory that was ever done when he said there was nothing in it; that the tooth was not an electrolyte; that it would not conduct electricity. Now, what are the facts? A normal tooth is not an electrolyte. A good filling properly inserted in such a tooth will last forty or fifty years. But a tooth which is in a state which permits mobility of its molecules is an electrolyte. A child's tooth, that no one now fills with gold, is fifty per cent. organic matter, and is an electrolyte. So if when we approach the pulp any portion of the structure is broken down, that is also an electrolyte. A piece of gold put into the mouth when wet with the saliva assumes a potential. Every filling in the mouth, every crown or bridge, is at a potential higher than the fluids of the mouth. A galvanometer touched to fillings of gold and tin in the mouth will show a galvanic current. The consequences of the flowing of this current are not felt in normal teeth, but the effects show in the teeth with bruised or injured dentine. He has had fillings come loose and the tooth under them sensitive, which could only be explained by the electro-chemical theory. He now removes such fillings and refills the cavity with gutta-percha to prevent a recurrence.

Some one had expressed the thought that he claimed the originating of the use of tin as a lining for cavities. All he claimed to set forth is to know how far gold will preserve the teeth. In using tin and gold together he would wet the surface of each layer and then there would be no electrolysis, and the two would form an alloy which would be hard like amalgam. He would not recommend this course, but he himself would do it. If there was too much gold in a filling put in with dry surfaces it would do no harm; if too much tin, the tin would be dissolved out to some extent, leaving a pit. If tin and gold are put together in the way suggested, there would be no separation between the two metals.

In reply to Dr. Crawford's question, he would say that in a battery of copper and zinc, in a sulfuric acid solution, oxygen is liberated at the zinc, which is positive, and the hydrogen passes over to the copper, which is negative, so that the tendency would be for acids to accumulate at the positive pole, and alkalies at the negative.

Dr. James Truman, Philadelphia. Dr. Palmer says that if cotton is put into a cavity, there will be sensitiveness. Where is the battery there?

Dr. Palmer. That is putrefaction, the result of a chemical action. He wished every one would clearly understand that there is a difference between electro-chemical and chemical action.

The subject was closed, and the section was then passed.

Section VII, Anatomy, Pathology, and Surgery, was called, and the chairman, Dr. Truman W. Brophy, Chicago, read the report, cataloguing the various articles upon the subjects embraced within the jurisdiction of the section which have appeared in the dental and medical journals within the year. Dr. Brophy also read a paper describing "A New Operation for the Exsection of the Inferior Dental Nerve," illustrating it with instruments, drawings, and specimens. After adverting briefly to the well-known methods of procedure, Dr.

Brophy stated that the operation which he had devised and practiced and now recommended to the profession was conceived during an operation which involved the passage of a flexible silver probe into the canal. It occurred to him that a flexible drill, made after the form of the Gates dental canal-drill, entered at the mental foramen and carried backward to the inferior dental foramen, would thoroughly remove the contents of the canal. In operating by this method, it may be necessary to bevel the bone about the foramen a little, to permit the introduction of the drill on a line with the canal, which makes a curve about a half-inch posterior to the mental foramen, and then gently curves upward as it passes back. The flexibility of the drill makes it easy to traverse the canal quickly. The drills should be graduated and so constructed as to cut as they pass along their course. If the operator desires, a large broach after the Donaldson form may be carried back in the canal to thoroughly remove any remnants of nerve-tissue. Of course the operation should be performed under antiseptic precautions. The after-treatment consists in antiseptic cleanliness.

Dr. Truman. What is the result of this operation?

Dr. Brophy. The result is to relieve the neuralgia, as was intended. He had operated in this way in three cases. He had received a letter from one of these patients, stating that he was entirely well in three weeks. The great advantage of this operation is that there is no sacrifice of tissue to speak of except of the part it is intended to remove.

Dr. Crawford. What were the ages of the patients?

Dr. Brophy. One was a man of fifty. the second a man of thirty-five, and the third a woman of twenty-eight or thirty.

Dr. Marshall. Was the operation performed without division of the lower lip?

Dr. Brophy. Yes, sir.

Dr. Marshall. In how many cases can this operation be done without dissecting away the lip?

Dr. Brophy. You can see by the specimens that the course is deflected a little, which avoids the necessity of cutting the lip. By the sense of touch you recognize when the drill is just through the inferior dental foramen, so as to avoid cutting the soft tissues on the inside of the mouth. The nerve-tissue is removed as easily or more easily than the pulp is taken from a tooth.

Dr. Marshall. What do you do about the hemorrhage?

Dr. Brophy. We don't have any.

Dr. Marshall. That is strange.

Dr. Brophy. If the operation was within the mouth, we would have hemorrhage, but it is avoided by this operation.

Dr. Marshall. How long since the first operation was made?

Dr. Brophy. April, 1894.

Dr. Marshall thought the time not sufficient to prove that there would be no recurrence of the neuralgia. The history of these cases proves that in the great majority of the exsections of the nerve for neuralgia there is recurrence of the trouble, not only where the entire nerve is removed, but in cases of section or where relief is attempted by means of avulsion or stretching. We can relieve by these operations—he had known the relief to continue for a year,—but in the majority of cases there is a recurrence of the neuralgia, and we have to do the operation over and over again before we succeed, and we may not succeed at all, except in cases where the trouble is peripheral. Even as much as three inches of the nerve lies back beyond where we can reach, and many times the seat of trouble lies in the deep canal which comes from the brain. He did think this operation was perhaps an easier way of exsecting the inferior dental nerve than others which have been offered. He did not like Garretson's operation along the base of the jaw, although it was brilliant. He liked this of Dr. Brophy's better, although he should expect considerable hemorrhage, especially if he punctured the inferior dental artery.

Dr. J. D. Patterson, Kansas City. What if the instrument should break off?

Dr. Brophy. You must be exceedingly careful not to allow that to happen. If there is not too much force used it is unlikely to occur, but if it did, he should remove the plate and take out the instrument together with the nerve. With proper care there would not be much danger of such an accident.

Dr. Geo. H. Cushing, Chicago, asked Dr. Brophy if he said there would be no recurrence of the neuralgia.

Dr. Brophy replied that he did, and he would repeat that there would never be a recurrence of the neuralgia if the nerve-tissue was removed thoroughly from the canal. There would be a deposit which would organize bone and fill the canal. He had accomplished this thorough removal in cases ten years ago by another method, and there had been no reunion of the nerve, and the trouble which had existed before had not returned.

The subject was passed, and a paper by Dr. Wm. N. Morrison, St. Louis, entitled "Planting Teeth," was read by Dr. P. H. Morrison.

Referring to his report of cases of replanting and transplanting teeth made to this association in 1876, Dr. Morrison said that he had kept steadily in the practice of planting and transplanting, aggregating many hundreds of cases, and in not a single instance has he had an unfavorable or dangerous symptom. He formerly relied on fresh specimens, and still preferred them, though Dr. Younger's demonstration of the value of dry specimens had greatly facilitated the operation. No intelligent answer has been vouchsafed by the scientists to the question why the odontoclasts will attack the roots of some planted teeth which have been comfortable in the mouth for twelve or fifteen years, nor have they given a line of preventive treatment. He had discovered that a sort of massage treatment, with the ball of the finger and bristles of the tooth-brush, of the whole plate of the alveolar process, exerting friendly friction several times daily, with frequent rinsing with warm water, will preserve the root and crown the longest time.

The essayist then stated that a case which was originally reported to the association in 1875 was seen a year or so ago, and the implanted tooth was still useful, having done faithful service for nineteen years. He also reported other cases, and showed specimens, one of which was a tooth which when first planted was declared a failure, but had remained in the jaw fourteen years, and its successor was transplanted in October, 1893.

The section was passed, and the association adjourned to meet the next day at 9.30 o'clock.

(To be continued.)

The paper read by Dr. V. H. Jackson, of New York, which was referred to last month, was entitled "A Method of Making Appliances for Correcting Irregularities of the Teeth. Method of Retaining Teeth that have become Loose from Pyorrhea Alveolaris, and those that need to be Retained after Regulating; and a Method of Making a Suspension Plate to Support Artificial Teeth without causing Pressure on the Gums."* Dr. Jackson's paper is printed below:

Before speaking of the method of making appliances, as indicated by the title of this paper, I will read the notes I made of the first case we are about to consider.

Mrs. E., a lady in society, was referred to me in November, 1893, for advice regarding her teeth. I noted the following history: Age thirty-eight years; lower jaw prognathous (with the lower incisors closing in front of the upper ones); the other teeth articulating in nearly a normal position. Five teeth had been extracted, all of them molars. There remained in the upper arch four molars (two on each side), and three in the lower arch (two on one side and one on the other). The crowns of the first and second left superior bicuspids had been removed and porcelain ones substituted. The crown of the first right superior bicuspid was absent, and an all-gold one was in its place. The gum about the lower incisors was receded and diseased. The right lower central incisor was somewhat loose, and was moved outwardly by the superior incisors in closing the teeth together. The labial side of the superior incisors was considerably worn, and appeared stubby. The upper lip was sunken, and the facial line was not good. The patient observed that each year the lower incisors were closing higher in front of the upper ones. There had been an unsuccessful attempt to correct the irregularity when the patient was about twenty-eight years of age.

After acquiring the above history, my attention was directed to the consideration of the probable result if the irregularity of the teeth should not be corrected. With the assistance of the models, it was determined that unless there was interference the lower incisors would gradually be forced to take a more prominent position, and one or more of them would soon be so loose as to necessitate their removal; the lower jaw meanwhile would become more prominent, the upper lip more sunken, and the superior incisors more worn. On the other hand, several important advantages would be gained by correcting the irregularity. The wear on the fronts of the superior incisors would be stopped. The corrected articulation would assist mastication, and proper use would improve the nutrition of the parts. The lower incisors would have more support by being pressed back into the arch, rather than forward as before. The profile would be improved by removing the sunken appearance of the upper lip, and the prominent effect of the lower jaw would be lessened.

After carefully considering the many points involved, including the age (thirty-eight years), tendency to disease of the gums, and the conditions enumerated, I recommended that the superior incisors be moved forward so that they would rest in front of the inferior ones. The patient expressed herself as desirous of having the work done.

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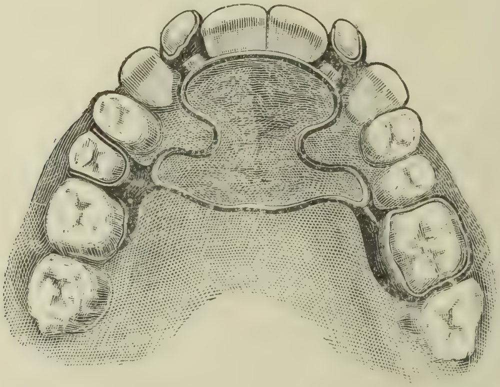
* Copyrighted, 1893, by V. H. Jackson, M.D., D.D.S.

I made an appliance of German silver, Fig. 1, and arranged a "crib-spring" to anchor it to a tooth on each side of the arch. The anchorage was made similar to that described in detail in a paper I read before this society at Saratoga in August, 1891, and which I will again refer to briefly, in connection with the method of making this appliance.

A "partial clasp" was formed to the palatal side of the first left superior molar, and a "crib" wire, No. 21 Brown & Sharpe's standard wire gauge, was shaped to pass across the labial side of the molar, at the gum line, with the ends bent to extend over the arch at the junction with the adjoining teeth, and made to rest on the "partial clasp," the effect of which was to clasp the molar for anchorage on that side of the arch, and a similar "partial clasp" was arranged on the palatal side of the second right superior bicuspid and first molar, with a "crib" wire passing around the bicuspid for anchorage on the other side. It will be observed that with this arrangement, the anchorage did not come in contact with or interfere with the artificial bicuspid crowns.

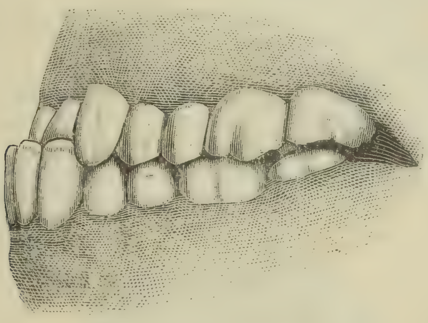
FIG. 1.



A base-wire, No. 14 in size, was bent to follow accurately the contour of the palatal arch from side to side, passing across the arch at about the line of the mesial surface of the second bicuspids. One end of the base-wire was then bent back nearly to a right angle, and the other bent forward so as to rest on the "partial clasps" described. A spring wire No. 19 was formed into a slight curve to rest on the lingual side of the incisors, reaching from the cuspid on one side of the arch to the cuspid on the other side. The ends of the wire were then bent with a small-sized clasp-bender backward, and again forward to form a loop, about one-fourth of an inch long, opposite the first bicuspid on each side. The loops were made to point toward the median line of the arch, with the free ends extending backward to pass across the "partial clasps," with the ends of the base wire. The different parts were then united to the "partial clasps'' with soft solder, by laying a piece on one of them large enough to do all of the soldering at once, using chlorid of zinc as a flux, and melting with a hot soldering-iron. The parts were then smoothed with a carborundum stone and polished the same as we polish a metal plate.

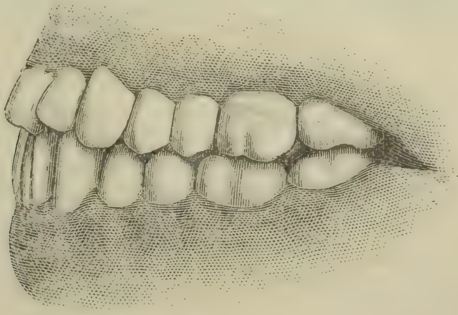
In this case (as in others I have previously described) I did not arrange the appliance to open the bite. It is not necessary in the majority of cases.

FIG. 2.



A gold and platinum collar No. 33 gauge, with a large lug, made by soldering a piece of wire to the lingual side so that it would rest near the gum, was cemented to each of the lateral incisors, to retain the spring of the regulating appliance; and when the regulating was about one-half completed, a similar collar was put on one of the central incisors. The action of the appliance was controlled by opening the loops in the spring wire.

FIG. 3.



The regulating was begun December 1, 1893, and the superior incisors had been moved forward to close in front of the inferior incisors on December 29, being twenty-nine days. The appliance without change was kept in position to retain the teeth until January 18, 1894, when it was removed. Figs. 2 and 3 show in profile the conditions before and after treatment. It will be remembered that the lower incisors were loose from pyorrhea alveolaris, one of them especially so.

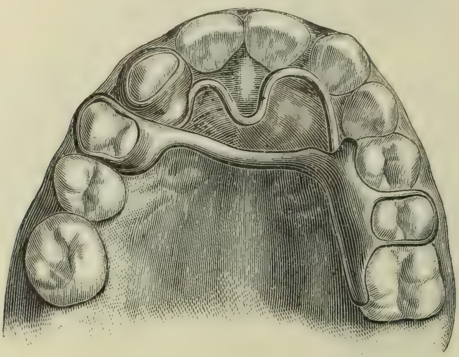
After removing the appliance, the tendency of the superior incisors to return to their original position made pressure inward on the inferior incisors, causing them to crimp. That is, some of them took a position slightly in advance of others. This tendency was corrected by grooving longitudinally the approximal sides of the loose incisor, and rounding the sides of the two adjoining teeth to fit into the grooves, and flattening slightly the approximal sides of some of the other incisors. By this arrangement both the superior and inferior incisors were well retained in position.

When I last saw the patient, in June, the superior incisors were firm, and the inferior incisors were more firm and in a healthier condition than before the operation.

Fig. 4 illustrates a device for moving outward a right superior cuspid, that had erupted inside of the natural curve of the arch.

The foundation or base-wire of the appliance was made with a No. 14 wire in the same manner as described in making the appliance in Fig. 1, which was formed to cross the arch at about the line of the mesial side of the second bicuspids, following the palatal curve. The ends were anchored to a bicuspid on each side of the arch with a "crib" spring. The part of the spring wire to move the cuspid outward was made into the form of a letter "S" about three-eighths of an inch long, and arranged on the left side, with one end shaped to cross a "partial clasp" on each of the bicuspids and the first molar, to which it was soldered with the end of the base-wire. The other end of the spring wire was made to extend in a gentle curve across the arch to the cuspid to be moved, where it was bent nearly to a right angle and shaped to pass underneath a lug on a collar that was cemented to the tooth. The loops in the spring wire were opened to cause the desired pressure.

FIG. 4.



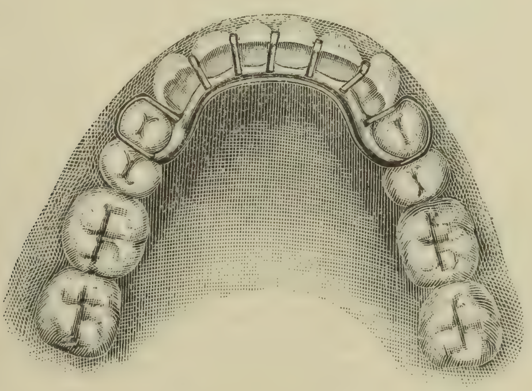
In the appliances before us, the advantage of having the base-wire cross the palatal arch, rather than follow the lingual curve of the teeth as I have described in previous papers, is apparent. If the base-wire or any part of the appliance needs to be made more rigid, two or more wires can be formed to run parallel on the model, and united with solder. Occasionally a more satisfactory result may be obtained by fitting a thin piece of metal underneath the wires on the model before soldering.

I will now present a model, with an appliance, describing a removable device to be worn constantly for retaining teeth that have become loose from pyorrhea alveolaris. It can be also used to retain teeth that have been regulated. (See Fig. 5.)

Before making the model on which to make the appliance, any of the teeth that have elongated should be dressed with a carborundum stone to correspond in length with the adjoining ones, being careful not to injure the pulp of the tooth. A model of the arch of teeth is then made and trimmed accurately, and if only the lower incisors are to be retained, a small base-wire, either round or half-round, is formed to the lingual curve of the arch, not touching the gum, extending to a bicuspid on each side, to which the ends are anchored with a ''crib'' wire passing over to the labial side of them as described in making ''crib'' appliances. A mark is then made on the model about one-sixteenth of an inch above the base-wire, from one side of the arch to the other. The base-wire is then removed.

A thin piece of metal about one-eighth of an inch wide, and long enough to reach from the anchorage on one side of the arch to the anchorage on the other, is fitted to the lingual side of the teeth to be retained just below the line marked on the incisors, using a metal instrument or pointed piece of wood or ivory to bend it into the depressions between the teeth. In effect this metal is similar to the ''partial clasp,'' and for convenience we will term it a ''continuous partial clasp.'' The base-wire is now replaced, having the ''continuous partial clasp'' between it and the model, with the upper edge projecting above the base-wire.

FIG. 5.

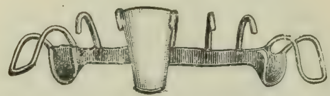


A short piece of small wire, or flat metal, with the end curved in the form of a hook, is formed to pass from the base-wire to the cutting-edge, at the junction of two of the teeth, where the hooked portion passes over the arch to the labial side, extending about one-sixteenth of an inch toward the gum, or as far as necessary to retain them, fitting into the depression formed by their convex surfaces.

The groove at the junction and cutting-surface of the incisors can be deepened if desired, sufficiently to let the curved portion of the wire remain flush with the cutting-edge, or the wire can be flattened with a carborundum stone on the outer or inner side for the same purpose. As many arms of this kind as are required can be fitted to place in the same manner, the end always extending onto the ''continuous partial clasp'' to touch the base-wire. The arms and base-wire are then joined with solder to the ''continuous partial clasp.'' If soft solder be used for the purpose, the arms can be held by pressing down on the curved portion with paper or a wad of cotton, and the soldering done with a soldering-iron. If gold or silver solder is to be used, the model should be made of plaster and marble-dust (or their equivalent), and the several parts held in position by flowing some of the plaster mixture over the wires at any place that will not interfere with the soldering. An arm should extend over the arch each side of each loose tooth, to prevent their tendency to separate and rotate. If the teeth be close together, one arm at the junction of two teeth will hold that side of each of them.

If the teeth have become separated, they can be drawn together, and the appliance made to hold them in that position. If there is a space between them, an extra arm can be made to extend to the cutting-edge like the one described, or the end of the arm can be broadened by soldering a flat piece of metal to it in form to rest on the labial side of the adjoining teeth. If preferred, a short arm can be made to extend through the space in the form of a slight hook, the end of which should rest on the labial side.

FIG. 6.



An appliance made in the manner described in the foregoing can also be utilized for holding loose cuspids, bicuspids, or molars. It is rather more practicable for the lower than the upper arch; however, it can often be utilized to good advantage in the upper arch, and will prevent the elongation and separation that is inevitable without treatment.

If the teeth have separated and elongated, the use of an eyelet in the palatal side of the tooth, with an apparatus made as I have described in clinics and in the Transactions of the World's Columbian Dental Congress, may be more useful in the upper arch.

If a loose incisor that has been retained with an appliance, the foundation of which is a base-wire, should become entirely separated from its alveolus, a plate tooth can be fastened with solder to the base-wire, and made to fill the space by making a backing for it and soldering as described in making the appliance. (See Fig. 6.)

Occasionally a patient prefers to have the natural tooth replaced. In such an event the root should be removed, leaving the crown the proper length, the pulp-canal filled, a backing fitted to it, holes drilled through the backing into the tooth, and pins inserted.

If soft solder be used for uniting, the natural tooth will not be injured with the required heat; but if gold or silver solder be used, which requires a higher heat, the backing and pins should be held in place with wax, and the tooth removed. Plaster and sand is then run about the parts, to hold them in position while soldering. After soldering, the pins should be serrated with a sharp instrument, and the tooth cemented to place with oxyphosphate of zinc.

If a plate tooth be used it should have a backing, and held in place for soldering the same as in making a metal plate.

I call this device a "suspension plate." If the gum is unhealthy, it has several advantages over the ordinary plate. It is suspended from the teeth, causing no pressure on the gum, which should be avoided in cases of pyorrhea alveolaris, especially while under treatment. It holds the loose teeth in position, which makes them useful, and at the same time supports the artificial one.

If a loose tooth has a space on each side of it, it can be retained by fitting a "partial clasp" on the lingual side, above and below the lingual prominence of the tooth, which will prevent it from rising out of the socket, and arranging a "crib" wire to cross the labial side of the tooth at any place advisable, with the ends extending either side, and upward somewhat toward the cutting-edge, then downward on the lingual side, which in effect will make a spring of it. The ends are then to be bent toward each other to rest on the "partial clasp," both of which should be attached to the base-wire with solder, and anchored with "crib" attachments as previously described. If the "crib" wire is arranged to cross near the neck of the tooth, or near the cutting-edge, the "partial clasp" should extend on the lingual side a little beyond the level of the "crib" wire on the labial side, to assure a correct line of resistance, so the pressure of the "crib" spring will not change the position of the tooth, but hold it firmly against the "partial clasp;" or, another method is to extend an arm of wire or flat metal from the "partial clasp" through the space on either side of the tooth, with the ends in the form of a hook, to rest on the labial side.

If the gum is receded, exposing the necks of two or more loose incisors, and the lingual prominence is well defined, an appliance can be made to support them by fitting a "continuous partial clasp" on the lingual side to cross them, and broad enough to extend a little above and below the prominence or singulum. Then arrange a spring-wire to cross the labial side of the teeth, with the ends passing over the arch usually at the junction of the lateral incisor and cuspid on each side, to be attached to the "continuous partial clasp" with solder, which will also make the "continuous partial clasp" more rigid

If the gum is receded from an incisor that is strongly attached in the socket, but movable and interfering with the articulation of the teeth, it can be held in place by fitting a "partial clasp" to the lingual side of the model of the tooth, extending as near the gum and cutting-surface as necessary to make a good anchorage, with the ends narrowed and made to project onto the lingual sides of the adjoining teeth, the effect of which, when the appliance is made, will prevent the loose tooth from moving forward. A "crib" wire is then made to cross the labial side of the loose tooth, with the ends extending over the arch either side to the "partial clasp" to which it is soldered. The sides of the "crib" wire should project slightly onto the labial surface of the adjoining teeth, to prevent the loose tooth from moving backward.

These devices are often serviceable for retaining teeth that have been regulated. Vulcanized rubber can be used for uniting the wires if desired.

Another appliance that is worthy of our consideration for retaining loose incisors is made as follows: a base-wire is formed to the lingual curve of the arch, with the ends anchored with a "crib" wire to a bicuspid on each side. A spring-wire is then formed to fit the labial side of the incisors, with each end bent sharply to a right angle at the junction of the lateral incisor and cuspid, to extend over the arch to the base-wire to which it is soldered. A "continuous partial clasp" can be arranged on the lingual side, and attached to the base-wire, if necessary to prevent the teeth from rotating. The appliance is easily removed by the patient for cleansing.

It is unfortunate that we have no general means of retaining teeth that have become loose from pyorrhea alveolaris, except by the use of metal, which is usually objectionable in appearance. The method that I have devised that is the least noticeable in this respect, is made by forming a small "continuous partial clasp" of thin metal on the model, on the lingual side near the cutting-edge of the incisors, crossing the loose teeth, and extending onto those that are sufficiently firm to support them. Solder is then flowed over the "continuous partial clasp" to stiffen it.

If during mastication much pressure is to be brought upon the incisors, the thin metal of the "continuous partial clasp" should be swaged to extend onto the cutting-edge of the teeth, and solder flowed over the outer side to stiffen it as described. A small hole is then drilled between the natural teeth that are to be retained, with a pointed enamel-drill, and near the cutting-edge if their shape will permit. The "partial clasp" is then applied, and with a slightly smaller drill the hole is extended through it while it is held in position. A small round (or oblong) head, similar to that of a common pin, is formed on a wire of suitable size to enter the hole drilled between the teeth. A thread is then cut on the wire, and in the hole in the "continuous partial clasp" in which it is to screw. A small groove is cut in the head of the screw to assist in turning it to place.

To recapitulate: first, the ends of the "continuous partial clasp" should be held in place with a screw in the manner described, then the holes drilled, and the screws arranged between the intermediate teeth. After all of the parts have been fitted to place, the rubber-dam should be applied, and a slow-setting oxyphosphate cement should be spread on the inner part of the "continuous partial clasp," which is put in place, and the screws adjusted before the cement hardens. If there is a separation between the teeth, a thin piece of metal can be arranged to span the space and project slightly onto their labial surfaces. The metal can then be thickened with solder, a hole drilled through the center, and a screw inserted the same as described.

Dr. M. L. Rhein, New York, asked what kind of metal Dr. Jackson used in constructing his appliances; did he refer to any particular kind?

Dr. Jackson replied that he advised gold where it could be utilized, but spring gold is not so good in many cases as German silver. In making a regulating device, if there are many angles in the fixture he preferred gold because of its easier adaptation under such circumstances. Where greater rigidity is required, iridio-platinum may be used. German silver is used in a great many mouths, where there is no acidity, with perfect satisfaction. This metal can be used with soft solder or with silver or gold solder, as desired ; but in case the last named is used, care must be exercised not to overheat. When soft solder is used there is no danger of overheating.

Dr. B. Holly Smith, Baltimore, asked Dr. Jackson to explain his ideas with reference to tinning the springs used in his devices.

Dr. Jackson. The best spring for regulating purposes is piano-wire, and he recommended that it be tinned if to remain in use for a long while ; if not to be in use more than six months, it is only necessary to keep it clean. Crib springs are always made of German silver, perhaps a size larger than if piano-wire were used. If piano-wire is used with the German silver, the former will corrode ; so he tins it under such circumstances. There is no need to tin a fixture of German silver.

Dr. J. Y. Crawford, Nashville, Tenn. What does Dr. Jackson think of the propriety of removing teeth which have been regulated, after they have been gotten into position, to cleanse them from calcareous deposits, and then replanting them?

Dr. Jackson replied that a tooth which had once had a calcareous deposit was never fit to be reimplanted. A tooth depends to a considerable extent for its nourishment on the pericementum, and the openings for the vessels become enlarged. An implanted tooth is held mechanically ; little granules of tissue extend into these openings. If there has been a deposition of tartar it gets into them, and cannot get away. If you scrape the tooth to get rid of the deposit, you roughen it, and so supply the first element for inflammation ; for if you injure the surface, nature never can smooth it, and it is merely tolerated. If there has been a deposit of calculus upon the root, it never can remain. You may smooth the end, but that is another matter.

Dr. W. H. Morgan asked what Dr. Jackson meant by the term "spring gold."

Dr. Jackson replied that he meant what was sold by the dealers under that name,—clasp gold, or platinized gold. There is spring silver also.

Dr. Morgan said the best spring gold he had ever seen was ten per cent. of platinum in the purest gold that could be got, say at least twenty-two or twenty-three carat gold. It anneals very readily, but when annealed it loses its spring.

Dr. Jackson said that German silver was the best material for springs he has so far found, but he was experimenting on another which promised well, though he was not yet ready to report upon it.

Dr. W. O. Kulp, Davenport, Iowa, described a method which he employs more especially in cases in the lower jaw where the teeth have become loosened, to stay them in position, which is somewhat different from those described. Instead of making a continuous clasp, he takes the measure of the teeth in the usual way for crown-work and makes bands over the entire teeth, of platinum, No. 26 to 30, soldered with pure gold. These are fitted to the teeth as for full cap-crowns, and then the labial side is cut out as near as convenient to the gum. Then after the bands have all been placed on, an impression is taken, and the bands removed and placed in the impression ; the bands are soldered together on the lingual side, clear up to the cutting-edges of the teeth, so that the entire lingual surface is covered with gold or platinum. Then gold is flowed over the labial surface. Sometimes it is cut down so that partly gold and partly platinum show. By this method there is only a narrow rim of gold shown. The entire lingual surface is strengthened and covered. The piece is put on with cement just like a bridge. Dr. Kulp has patients who have worn these appliances fifteen or twenty years, even when the teeth were so loose that they had to be held while the piece was put on. In a case having a fracture in the center of the jaw, sent to him by a surgeon, he made an appliance of this sort, extending from cuspid to cuspid, with a piece of plate from the platinum bands on the lingual side. After the fracture was adjusted and the piece put on, the patient went out and ate a beefsteak. The surgeon who sent the case prophesied that there would be no osseous union. The patient wore the appliance about six months,—wouldn't have it taken off sooner,—when the surgeon pronounced the case a perfect success.

Dr. J. N. Crouse, Chicago, described an automatic pump which works by water-pressure, like an engine, to get air into a cylinder. It will give a pressure of sixty-five pounds, and will run a continuous-gum furnace.

Dr. Kulp. Dr. A. O. Hunt has invented an air-pump which costs four or five dollars, and will give enough air to run a continuous-gum furnace.

SOUTHERN DENTAL ASSOCIATION.

(Concluded from page 811.)

THIRD DAY—*Afternoon Session.*

THE association was called to order at 3 P.M.; President B. Holly Smith in the chair.

Dr. G. J. Friedrichs read a paper on

DENTAL CARIES AND POPULAR FALLACIES,

of which the following is an abstract:

Caries of the teeth is produced by the chemical disintegration of the elements of the teeth, molecule by molecule. This disintegration always begins at the surface, usually in some pit, fissure, or other irregularity at the point of contact of the approximal surface or about the necks of the teeth, and spreads into the interior of the organ, and, as dentine is more readily destroyed than the enamel, a cavity is formed whose interior is larger than its orifice.

Pasteur demonstrated that neither putrefaction nor fermentation could progress without the presence of organic germs. Drs. Underwood and Milles, in a paper read before the International Medical Congress in London in 1881, entitled "Effects of Organisms upon the Teeth," summed up the following conclusions as the result of their experiments: "We consider that caries is absolutely dependent upon the presence and proliferation of organisms. That these organisms attack first the organic material, and, feeding upon it, create an acid, which removes the lime-salts; and all the difference between caries and simple decalcification by acids is due to the presence and operation of germs. That suppuration of the pulp and its sequelæ, such as abscess, depend also upon the successful working of organisms. We feel justified in concluding that the successful exclusion of germs would prevent the disease.''

Since then other investigators in the same field have confirmed these views, yet, notwithstanding this plausible theory, which accounts for the general cause of caries of the teeth, there still remains a ''missing link'' in the problem of dental caries which the germ theory does not solve, and that is what is called ''Dental Erosion,'' a disease where the wasting of tooth-substance takes place without apparent cause ; it sometimes attacks only one tooth in the arch, while the rest of the teeth remain intact and unaffected.

The singular peculiarity to be noted is, that it attacks both the enamel and dentine, while against ordinary caries the enamel is a protection. Its favorite field for action is the labial and grinding surfaces of the teeth, and it generally leaves the eroded surfaces perfectly smooth and polished. When it attacks children's teeth, it is generally confined to the incisors of the superior maxilla.

Caries of the teeth is essentially a disease of youth, and it is a notable fact that the predisposition to caries diminishes as age advances. One reason is that by the time a person has passed the age of eighteen, all points favorable to decay have been attacked, and as we advance in years the teeth become more dense.

The remedies employed to stay the progress of caries are mechanical. In some cases filing out the carious spot, polishing the surface, and leaving self-cleansing spaces will answer the purpose. The application of nitrate of silver until a covering or film is deposited on the surface of the carious spot will arrest its further progress, provided there is no depth to the cavity, so that no extraneous substance can remain to dissolve the film in the process of fermentation which constantly takes place in the oral cavity. In the disease called green tartar, if applied in its incipiency, it acts as a specific.

When the cavity has advanced to such a degree that neither of the above operations will apply, obturation must be resorted to to save the tooth. The material must be inert and indestructible ; it must be packed solidly so as to render it impermeable, and secured in such a manner in the cavity that force will be necessary to dislodge it ; the material must be left flush with the orifice of the cavity, and finished so that it can be kept clean. If these conditions are not attained, no hope can be entertained that the operation will preserve the tooth from future decay.

Discussion.

Dr. T. B. Welch said that he thought the paper a valuable one, and the conclusions reached were sound. He spoke of a gentleman who had kept his teeth in order by filing off any rough spots that appeared on them, thus removing the cause of decay and preventing the formation of cavities where food would lodge.

No people is as liable to caries of the teeth as the American. Foreigners who come to our country become liable if they eat as the Americans do. Among the poorer classes better teeth are to be found than among the wealthier, because of the different preparation of the foods, and the larger amount of sweets, confectionery, and rich foods used by the wealthy.

Dr. J. Y. Crawford said unless we understand the cause of caries of the teeth better than we have, we will never make much progress in its prevention and treatment. Among the factors which enter into the cause of caries he named the tendency generally called diathesis, climatic influence which weakened the structure of the teeth, zymotic diseases, and the want of functional activity. He did not think hereditary influence had anything to do with it, nor was it an important factor in irregularities. Man is a compound being, with three natures—the intellectual, the physical, and the moral. To approach perfection he should cultivate these three equally, and the excessive development of either would result in harm to the others. We pay too much attention to the intellectual cultivation of children, and in consequence their physical beings suffer. No child should be sent to school until it is ten years of age, nor should it be subject to anything like mental effort before it is nine years old.

The report of the Committee on Dental Hygiene being called for, the secretary, Dr. S. W. Foster, said that, in the absence of the chairman of that committee, he would state that two papers on the subject had been received, one by Dr. Thomas E. West, of Natchez, Miss., and the other by Dr. R. R. Freeman, of Nashville, Tenn. As Dr. West was not present, Dr. R. R. Freeman, of the committee, read his paper, of which we give an abstract as follows :

He spoke of the importance of oral hygiene in connection with digestion, concluding that the unhygienic condition of the oral cavity was often the cause of indigestion ; that imperfect organs of mastication caused imperfect preparation of food for the stomach. Uncleanliness is nearly always the prime factor of the diseases of the mouth. It is necessary therefore to teach the people to prevent these disorders by careful attention to cleanliness. We dentists should see that every case that comes under our hands leaves us in a perfectly clean state, and that all artificial dentures too should be absolutely clean ; and that patients are impressed with the necessity of keeping them so. Bridge-work is especially apt to be filthy, and needs a great deal of care to keep clean.

In closing, he said that in the future the services of the dentists would be prophylactic or preventive rather than curative.

Dr. R. R. Freeman then read his own paper on the same subject, in which he gave the following definition: Hygiene, the laws of health applied, whereby a man can come to the full vigor of life and accomplish that measure of usefulness and enjoy that happiness which human existence may afford. A knowledge of this science will secure the means of battling against conditions likely to produce discomfiture, pain, sickness, and death. Violation of these laws is sure to entail calamitous results. Health, happiness, and prosperity are only to be attained through the application of nature's laws.

The chairman, Dr. W. E. Walker, in addition to the above papers, submitted a *résumé* of what has appeared in the dental journals on the subject since the meeting of 1892.

His *résumé* was based on the definition of hygiene, "that branch of medicine of which the object is the preservation of health," and including in dental hygiene all that pertains to the preservation of the teeth, the health of the mouth and its tissues, the health of the dentist and the hygiene of his surroundings. He stated that as dental hygiene includes a broad field with many subdivisions, he had made the following classification of the papers which have appeared bearing on the work of this section, viz :

Dental hygiene *per se*.

The education of our patients and the public in dental hygiene.

Preventive measures in the hygienic care of children's teeth.

Personal hygiene, as relating to the dentist himself.

Hygienic precautions in the sterilization of instruments, the hands, etc.

Hypnosis in its hygienic as well as other aspects.

Hygiene in the prevention of decay, etc.

Dr. A. C. Hewett, of Chicago, demonstrated the use of chloroform for the purpose of inducing partial anesthesia. He said that years ago he accidentally discovered that chloroform had a strong power to deaden pain long before it acted as a general anesthetic. Upon one occasion, having a troublesome lower molar, he went into his dental office, and, opening a bottle of chloroform, smelled at it for a few moments. He then took a gum lancet to run it into the gum, for the purpose of letting a little blood to reduce the congestion. Finding that the lancet caused no pain he thought he could extract the tooth, and upon applying the forceps extracted it without pain. Since then he had used this method in hundreds of cases, always with the same success and never with any alarming symptoms. His method is to close one nostril and let the patient breathe the chloroform out of an open bottle holding about two ounces, and having a wide neck.

Dr. E. P. Beadles, of Danville, Va., asked Dr. Hewett how he knew when the effect of chloroform had reached the point when he could extract.

Dr. Hewett said the first sign would be a depression of the ala of the nose ; then a lazy sinking of the eyelids and a settling down in the chair. He wanted to affirm one thing about this method, and that was that it is absolutely safe. He had given chloroform in this way for more than thirty years, and almost every day. He had given it to patients who had heart-disease, so far advanced that their feet were swollen, and who had been tapped several times. He had never had an accident, and would not extract teeth without it.

Dr. B. Holly Smith thanked Dr. Hewett for suggesting a plan of procedure that promised to be safe. For himself he was afraid of chloroform, as he had had a nearly fatal accident from the administration of chloroform in the usual way. He, however, questioned seriously the absolute safety of even this method in all cases. It is well known that in some cases the very first inhalation of chloroform has been followed by death, and this body should not let the statement, that administered in any way chloroform is absolutely safe, go out without a word of caution.

Dr. H. B. Noble, of Washington, D. C., said that he thought it would be very unsafe to let such a statement go out without the warning that there is danger. He related a case of a patient in his own office who insisted upon taking chloroform, rather than ether, to have a tooth extracted, one who had taken both anesthetics and who preferred chloroform. Upon the patient taking one breath of the chloroform she sank down, and it was only by the most energetic measures she was revived.

Dr. T. B. Welch thought that the fact that a very large proportion of air would be mixed with the chloroform as it was breathed from a bottle, while when the drug was administered in the usual way the proportion was much smaller, would make the difference between safety and danger in the effect.

Dr. H. J. McKellops, of St. Louis, said he was cured of the use of chloroform by seeing a fatal result which occurred from one single breath of chloroform. Before the patient could be placed upon the floor she was dead.

Dr. R. R. Freeman thought possibly the success that Dr. Hewett had had was in part caused by the confidence which his manner would inspire in the patient. We do not know very much of the phenomenon called hypnotism, but we do know that a person with a confident manner and an honest-appearing countenance will exercise an effect upon the intelligence of others which will enable him to do almost anything.

Discussion closed, and the convention adjourned till evening.

Evening Session.

The convention was called to order at 8.30; Dr. B. Holly Smith in the chair.

The report of the Committee on Clinics being called for, Dr. Hinman read as follows:

Surgical clinic by Dr. H. E. Beach, of Clarksville, Tenn.

Case 1. Removal of lower left first molar for persistent abscess, accompanied by necrosis of the alveolus, using the new "common-sense" forceps.

Case 2. Removal of left superior third molar, where the second molar was crowded out of place fully its diameter, hoping that the latter would gravitate into position. The third molar was badly decayed, otherwise the second molar would have been extracted.

Case 3. Removal of superior right second bicuspid, the root of which was broken off under the gum; under local anesthetic, by the following formula, without pain:

℞—Cocain, gr. viii;
Antipyrin, gr. ii;
Aqua dest., ʒ iii.

Sig.—Inject 2 to 5 minims in gum.

Case 4. Patient, male; age 13. Edentulous space between left superior central and right lateral, left lateral absent. Right temporary central extracted about six months previously, according to the story of the patient. Indications of eruption of a tooth or teeth in the edentulous space. In the opinion of Dr. Beach, the missing central and a supernumerary tooth are present in the alveolus. An exploratory puncture showed what he believed to be an enamel surface. Dr. V. H. Jackson, of New York, examined the patient and believed the missing central to be erupting, but did not make an examination by exploration. He advised awaiting developments.

Dr. Jackson showed and explained his crib appliance for regulating teeth.

Dr. S. B. Cook, of Chattanoga, Tenn., showed his regulating appliance for the expansion of the arch in correction of irregularities. The appliance is made of aluminum bands and bars, put together with vulcanite, in which is placed a jack-screw for the purpose of expansion.

Case 2. Models of the mouth of a patient, aged 13, male, in which the superior centrals were very much elongated and protruded as the result of improper application of elastic rubber bands, used for the purpose of bringing together the two central incisors, preparatory to drawing them back in position. One of the bands became insinuated under the gum and remained there for some two years, which prevented the tooth, or teeth, from getting well after they had been brought into position.

Case 3. Loss of the superior lateral incisors, resulting in the spreading of the two centrals to such an extent that it was necessary to bring them together in order to get in two lateral incisors sufficiently long to give a natural appearance. This was accomplished by banding the two central incisors with gold bands, and soldering the palatal aspect of the same to a metal base projecting back over the palatal surface, around which was vulcanized a sufficient quantity of rubber, into which a jack-screw could be placed, having a reverse action to that of spreading the arch. The effect was to bring the two centrals together; the laterals being replaced by skeleton or open-faced crowns placed upon the cuspid teeth bar, extending back of and across the laterals.

Dr. B. H. Catching illustrated the use of the white linen shade roller in graduating and controlling the light used by the dentist, by means of a pulley attached to the ceiling above and back of the operating chair, the efficiency of the arrangement depending upon the reflection.

Dr. J. G. Hollingsworth began a piece of bridge-work, lower jaw, extending from the second bicuspid to the third molar, using his original method.

Dr. W. H. Morgan gave a clinical lecture, dwelling upon the plan of the examination of the patient, and paying especial attention to the importance of proper physical diagnosis, then, in detail, describing treatment and suggesting a probable prognosis.

In the treatment of dead teeth, he insisted upon their previous treatment before filling them, in order that the contents of the roots and tubuli should become mummified before filling.

He is a strong believer in the use of carbolic acid.

Dr. W. G. Browne, Atlanta, filled a lower buccal cavity in the right superior first molar, using sandarac varnish to hold in position a large pellet of gold, working into this strips, but not depending on the varnish for anchorage. The operator used a new mechanical mallet, exhibiting great skill and familiarity with the principles involved in the introduction and consolidation of cohesive gold.

Dr. R. R. Freeman, Nashville, Tenn., filled a superior second bicuspid and first molar with tin and gold, using tin at the cervical wall, lining the buccal wall with gold in order to prevent discoloration from the tin. He used a matrix made of the end of a No. 00 separating file, filling with thoroughly annealed extra cohesive gold cylinders, making a complete restoration of the teeth to the normal shape.

Dr. B. B. Smith, Gainesville, Fla., contoured a left superior central incisor with cohesive gold and made a simple filling in the right central, using cohesive cylinders and ropes, operating with automatic mallet; capping the nerve in the left central, using Genese's Nervine Vita.

Dr. C. L. Alexander, Charlotte, N. C., exhibited his universal sand-paper, corundum stone, and rubber cup mandrel.

Its special features are: the disk may be removed and replaced while in motion without reversing the engine, preventing torsion or breaking of the spring or cable. The mandrel presents many good points, being an economical, time-saving appliance.

Dr. J. H. Crossland, Montgomery, Ala., began a bridge-piece, using a hood crown on the cuspid for one of the abutments, and the second superior bicuspid for the other.

Dr. Wm. Crenshaw exhibited and demonstrated an abscess-drill, original with himself, with which a blind abscess may be opened into through the gum-tissue and the alveolus to the point of the root affected.

The device is so constructed and arranged that, after getting the length of the tooth from cutting-edge to apex of root, it may be so set that a suitably shaped drill may be directed unerringly to the end of the root of the tooth, thus establishing drainage by an open canal, through which medicaments may be passed, first through the tooth into the abscess, and thence out to the surface of the gum.

Dr. C. Sill exhibited a traction engine. It is intended to draw into shape a subcervical band when a superstructure of any kind of telescoping cap or band is required, on crowns of overjutting forms, saving all the usual time and pain from cutting off the tooth as done in the ordinary practice.

Dr. W. B. Ames demonstrated the manipulation of oxyphosphate of copper, calling attention to the fact that the maximum of density can be obtained after the material has been used in a semi-fluid state, and in that state the cement best exerts its germicidal influence, and that absolute dryness is not essential in its use.

Dr. Geo. Evans exhibited a method of crowning the front teeth, being in reality the adaptation of a partial collar cap, with a conically shaped pin formed to fit a hole made by the Ottolengui reamer. A disk of platinum 30 or 32 gauge is placed on the pin. Where the pin pierces the disk on the side next to the tooth a small portion of pure gold is flowed around the platinum disk next to the pin, which is removed during this process. The pin is then replaced on the disk and placed in position on the root. The disk is then snipped on the approximal and palatal surfaces; the disk is trimmed even with the porcelain on the front; on the ridge-lap a piece of platinum foil is fastened with shellac. The tooth is then backed with platinum 32 gauge, the cutting-edge being sharply beveled and the backing burnished about one-sixteenth of an inch beyond, at the same angle as the bevel. The pin is soldered to the disk, and the opening of the root is slightly enlarged to let the soldered portion of the pin go to place.

Dr. W. G. Browne, Atlanta, exhibited his parchment sand-paper disks, cutting as perfectly under water as when dry. As the disk is used, the grit becomes filled with metal, and the disk used to cut down a filling will also polish.

The exhibitors were J. W. Ivory, of Philadelphia; Dental Protective Supply Co., The S. S. White Dental Manufacturing Co., Gideon Sibley, Harvard Co., Edward E. Smith, Budd & Keisel, R. G. Stanbrough, Chas. H. Phillips Chemical Co., E. A. Pearce & Co., C. Ash & Sons.

Dr. H. J. McKellops commended the arrangements for the clinics, but regretted that some of the operators came without necessary instruments and appliances for the work they expected to do. He also spoke of the necessity of keeping a sharp watch that no quack nostrums be either exhibited in the clinics or peddled around during such meetings. The reputation of the association will suffer if it even appears to favor such things. We do not want them around, and men who come to push them should be excluded from the rooms.

On motion, the report was adopted.

Dr. Hewett, in closing the discussion on his methods of administering chloroform for partial anesthesia, said he wished to thank the gentlemen who criticised the method for their courtesy ; he appreciated it, and was glad to express his appreciation.

He thought, however, their arguments were rather creditable to the kindness of their hearts than to the soundness of their logic, from the premises that he had laid down,—viz, that there is an obtunding influence in chloroform sufficient to hold pain and sensitiveness in abeyance "without any danger." It is not fair to deny this statement because deaths occur almost daily under chloroform, whether from shock or from chloroform no one can determine. As dentists, we are to be congratulated because in this matter we are far ahead of the surgeons. If an accident occurs in a dentist's office, he will very justly be held to answer for it, while in such cases the surgeon will be allowed to assume a position above criticism.

He thought it wrong to produce full anesthesia for any dental purpose. He was not talking as to school-boys, but to men far above him in education ; but he was glad to know when a fair-haired little girl came into his office and asked him if he could extract her teeth without pain, that he could do it by means of a few whiffs of chloroform and do it safely. If there were a better way, he would gladly hail it, but this had been satisfactory in his hands for many years.

The reason why deaths occur from chloroform, he said, was because as a rule the chloroform was administered with the patient in a prone position ; and as chloroform vapor, as is well known, is much heavier than air, it falls from the sponge or napkin with very little admixture of air, and the lungs and bronchi are deluged with it. The shock is like a blow on the head with a club, and the patient succumbs at once. Under no circumstances should chloroform be given for dental purposes in such a way. The patient should remain seated, and if the chloroform is taken as he took it this afternoon, the amount inhaled is almost infinitesimal, and of danger there is absolutely none. Some may say there will be danger of shock unless the anesthesia is complete, but he said there was no danger of shock with partial anesthesia. He had lanced felons and even made a crucial incision across a carbuncle as large as his hand without the patients suffering pain. The danger of shock arises from deluging the lungs with chloroform.

There have been so many deaths from the use of chloroform that he disliked to use it, but he did not think, because there was danger in an improper use of a drug, the benefits which are offered by a proper and safe administration should be withheld from our patients. It would not be logical. All drugs that cause death may be safely administered, and with benefit.

Dr. C. N. Peirce said he did not think there was a case on record where a person committed suicide by means of chloroform while in an upright position, and that many people suffering with neuralgia take chloroform in the manner shown by Dr. Hewett for hours at a time. He himself had used it for neuralgia, and never thought of danger.

Dr. John S. Marshall, of Chicago, said there was always danger with chloroform, and he did not want it to go out as the decision of this body that it could be administered in any way, no matter how small the quantity nor how well it had been borne on former occasions by the same patient, without danger. There are people whom a single drop will kill. He spoke of a case where a single drop of chloroform had been put upon a pledget of cotton and inserted in a tooth which had an exposed pulp. The effect of the drug was such that the life of the patient had been saved only by the most active and protracted efforts. If two or three drops had been given to the patient, he thought death would have been inevitable. He realized every day that chloroform was dangerous, but still he uses it and has never had a fatal result, though he had narrowly escaped.

He would not chloroform a patient in his office, but would insist, if chloroform was to be taken for a dental operation, that the patient should be at home in bed and undressed, and the operation performed there.

Dr. John A. Daly read a paper on "Hygiene in Prosthetic Dentistry," advocating the use of gold lining on vulcanite plates.

The subject was passed without discussion, and the association adjourned to meet Monday.

Fourth Day.

The association was called to order at 11 A.M. On motion, the subjects treated of in the president's address were brought forward for discussion. The first subject was the duty of the national societies toward the state, district, and local societies.

Dr. John S. Marshall spoke of the desirability of establishing commissions to decide the scientific questions which might come before the association. The only difficulty in the way of doing much good in this way would be the want of funds. Such work costs money. If it could be done, it would be the best move ever made in dental science.

The other points brought out in the address were: The power of state examining boards, and in what way can they do the most good? Uniformity of state laws: how can it be secured? To what extent is it practicable for a national association to influence dental education? What is our association to do to settle mooted questions in practice? How can clinics before associations be made to do the most good? Can commissions be employed to ascertain truth on all subjects brought before the association?

Dr. V. E. Turner thought that a commission should be appointed to decide questions brought before the meetings, and report at the next meeting. In regard to examining boards, it is universally considered that they are a necessity. If this were not so, laws constituting them would not have been passed. It was a question still with many whether every candidate for practice should not have to stand an examination whether he had a diploma or not. The most progressive men in the profession seem to generally agree that it is best to examine every one. This is the practice with medical boards.

Dr. F. Peabody, of Louisville, Ky., thought that the examining boards of one state should recognize the examination in any other state, and suggested that the boards in all the southern states should agree to accept the certificate of the board of any one of them as sufficient evidence of proficiency and fitness to allow the holder to practice without further examination. It is impossible to determine the acquirements of the graduates of a school until they come before an examining board. If all the schools had always done their duty thoroughly, and not graduated any one who was not qualified to practice, there would have been no necessity for examining boards.

Dr. B. Holly Smith described the examining boards as being police powers to watch over the public safety, and wanted a commission to be appointed to draft a law which would be adopted by every state.

Dr. J. Hall Moore, of Richmond, Va., thought the professors in the colleges would acknowledge that the examining boards have done much good in elevating the standard of education in the colleges, and that the feeling is growing and being strengthened that they should really be examining bodies and not simply boards to pass diplomas. It is very easy for some men to get through college and get diplomas. He thought too that a certificate of having passed in one state should enable the holder to practice in any state.

Dr. John S. Marshall, of Chicago, thought the examining boards of the state should participate in the final examinations in the colleges, and should sign their names as examiners to the diplomas, and that such diplomas should be legal in every state. Further, he doubted whether there was a member of any state examining board who would pass the final examination of any first-class reputable college, and thought it unfair that they should wish to make one who desired to change his location pass an examination which they could not pass themselves.

Dr. George J. Friedrichs, of New Orleans, asked if dental laws were not class legislation.

Dr. J. Y. Crawford, of Nashville, Tenn., said that this had been asserted, but it is not true ; they were in the interest of the whole people. The trouble with the laws is that we have tried to keep men out of the practice of dentistry, while we ought to turn our attention to getting some out who are in and who were never worthy of admission. He thought that those allowed to practice in one state should be allowed to practice in any other, and that if a man who was duly qualified in one state should go to another and be forbidden to practice, by carrying it through the courts he would get a decision that such a law was unconstitutional.

Dr. Williams Donnally thought the main thing to be done or to attempt to do is to take into consideration the incongruities and inconsistencies of the laws of the different states, and endeavor to get the legislatures to bring them into greater consistency. As to the constitutionality of the laws, he said a case went through the Supreme Court from the state of West Virginia, and it was decided that the state had the right in her police power to make such regulations as she thought necessary.

Dr. E. P. Beadles, of Danville, Va., entirely agreed with the idea that a man who had passed the board of one state should be allowed to practice in any state, but thought that Dr. Marshall's plan of the board of dental examiners taking part in the college examinations, was impracticable.

Dr. L. G. Noel, of Nashville, Tenn., presented a paper which was read by Dr. H. B. Noble, entitled,—

Two Useful Ideas in Prosthetic Dentistry.

The first that I wish to present to you is a combination of gold and vulcanite for bridges. I do not know where this originated, or to whom the credit of the invention, if such it may be called, belongs. The idea presented itself to me shortly after I saw the first piece of gold bridge-work in the mouth, but I am indebted to my associate, Dr. M. McFerrin (who thinks the conception an original one with him), for urging me to put it in practice, and for valuable suggestions and assistance with my first case.

Suppose you have a case where the bicuspids and two anterior molars are lost on one or both sides of the lower jaw. You make your gold shells to invest the teeth that are to be the abutments of the bridge, and take an impression, bringing them away. You next get a model in sand and plaster, and with this before you, you proceed to connect the two shells with a strong bar of platinum and iridium, which is to give longitudinal strength and afford attachment for the rubber.

Having so far completed the frame-work of the bridge, we next proceed to get a bite. This can be done with either wax or modelling composition placed about the bar and adapted to the gum while soft.

Building up enough between the shells, we direct the patient to close the teeth upon it, and thus get the bite.

The completion of the work requires no further description other than that it consists in adjusting suitable vulcanite teeth and attaching them by the usual process. In many cases it will not be necessary to take a bite; the teeth may be waxed to the bar and adjusted to the opposing teeth in the mouth.

Since the rubber is to be cut away so as to make no bearing upon the gum, no model of the gum will be required. It will readily be seen how much shorter this process is than making all-gold dummy teeth and soldering them together. It may not be a shorter process than soldering in porcelain teeth, but the work when completed will not offer as many crevices for the collection of fluids and food as the gold and porcelain, and we think the teeth will stand the strain of mastication much better than those attached by solder.

Many modifications of the above plan will suggest themselves to the ingenious mind. For instance, greatly increased strength may be obtained by soldering in two bars, and vulcanizing in swaged gold grinding-faces instead of porcelain teeth. These grinding-faces may be well filled with solder, and for attachments some platinum pins may be caught in this solder. These may be waxed on and readily bitten into adjustment. [Models of the jaws of a young woman for whom Dr. Noel had made two such bridges accompanied the paper, and were shown to the members present.]

Idea No. 2. The patient had lost all the superior molar teeth and also the right second superior bicuspid. The following was my plan for restoring the lost superior teeth :

I made a gold shell to invest the first bicuspid on the right side and the second bicuspid on the left. As these teeth had rather long crowns and small necks, I did not carry these shells to the gum, but only let them extend to the knuckle. This I think much better than cutting away the enamel to bring the tooth to straight lines and covering the entire tooth. After getting my shells constructed and accurately fitted, the grinding-surfaces of the two bicuspids carrying the shells were ground away so as to shorten the bite sufficiently to allow for the thickness of gold laid over them. The same grinding was done at the same time upon the lower bicuspids, the bridges having been left uncemented for this and other obvious reasons. After getting an impression and model with the shells in position, an oval-shaped bar of platinum and iridium was bent into the form of a horseshoe and so adapted to the model as to rest upon the gum just behind the lingual surfaces of the teeth, and extended as far back as the space between the first and second molars. This carried it some distance posterior to the shells, and this part of the bar was intended to give attachment to the vulcanite and artificial teeth.

Having soldered the bar to the shells, a bite was taken, and the whole thing transferred to an accurate model taken from a reliable plaster impression, and completed in the usual way, using pink rubber, however, because of the possibility of its showing in the act of laughing.

This bar idea, to connect and give support to teeth on opposite sides of the mouth, may be used in various forms, and is subject to many modifications. I used it successfully to connect two artificial superior lateral incisors.

In this case collars were made for cementing to the cuspids, and these collars connected by a bar that passed across on the lingual or posterior surface of the centrals. The artificial laterals were soldered to this, and the fixture proved a great success. The usefulness of this bar idea in cases of regulating becomes at once apparent.

No discussion followed Dr. Noel's paper.

Dr. H. E. Belden, of New Orleans, read a paper on "Articulators," and exhibited an articulator of his own design.

Dr. G. N. Johnson, of Concord, N. H., read a paper on "Unprofessional Prosthesis," asserting that too little was taught of the subject of prosthesis in the colleges and too little attention given to it in the journals and association meetings. His conclusions as to how a rubber plate should be made are as follows :

1. Vulcanize the rubber plate between metallic surfaces, giving it the same smooth, continuous, polished surfaces and rounded margins as to a gold plate.

2. Adjust the teeth to articulation upon planes parallel with the

line of occlusion, thus avoiding clatter and twist and tilting of the plates. More dentures are failures from faulty articulation than from any other cause.

No discussion followed this paper.

A paper was read upon "The Care of Infants' Teeth," by W. N. Morrison, of St. Louis. The author believes that a majority of the deaths of infants under three years of age are due to complications arising from difficult dentition, and that nervous tension, not relieved by normal growth or development of the parts, seeks relief in reflex action on the stomach and intestinal tract, giving rise to the disorders known as summer disease, etc., and usually ascribed to climatic influence and improper feeding. He advocates careful attention to the unerupted teeth, and the use of the lancet as a means of relief, with attention to general symptoms.

No discussion followed, and the election of officers and selection of place of meeting for next year, as announced in our October number, took place; the new president was installed, and the convention adjourned to meet at Atlanta at such time as the committee on arrangements should announce.

AMERICAN MEDICAL ASSOCIATION—SECTION ON ORAL AND DENTAL SURGERY.

(Concluded from page 823.)

FOURTH DAY.

THE section was called to order, Chairman Goddard in the chair.

Dr. Goddard called Dr. Talbot to the chair while he read a paper entitled "A Study of the Lateral Incisor," of which an abstract follows:

In the dentition of man as well as of lower animals we find the incisors varying in number, form, and position more than any other teeth except the molars, and of single teeth we find greater variation in the lateral incisor than in any other tooth except the third molar.

In the lower orders of mammalia we find in most cases six incisors in each jaw.

Taking the typical parent mammalian dentition, I. $\frac{3}{3}$, C. $\frac{1}{1}$, Pm. $\frac{4}{4}$, M. $\frac{3}{3} = 44$, and observing that the hog and the horse have the same, Dr. Goddard noted the divergences found in the dentition of the dog, the cat, the hyena, the otter and some extinct insectivora, the lemurs, which last are typical of the Prosimiæ, which preceded the anthropoids in development, and of the quadrumana.

The individual teeth of the chimpanzee and gorilla very nearly resemble those of man. Those of the orang are still more like them. This is most noticeable in the canines, which in the carnivora are very large, long, and strong. In the quadrumana they gradually decrease, until in the orang they are not much larger in proportion than in man.

The paper then examined the dental formulæ of a few of the animals which have lost some of the typical teeth. The horse has lost the canine in the female, while it is rudimentary in the male. The cow, like all other ruminants, has lost the superior incisors and canines and one premolar. The fox squirrel has lost two incisors, all the canines, and three premolars. The rat has lost two incisors, and all the canines and premolars. The sloth has lost all the incisors, canines, and premolars, but has gained two superior and one inferior molar, probably a premolar retained permanently. The narwhal has lost all the teeth except one upper incisor on each side. Many other instances of missing teeth might be mentioned, but these are sufficient.

The paper then quoted from the "American System of Dentistry" Dr. Wortman's argument against the theory that the greater development of the brain is the cause for the tendency toward suppression of the third molar in some of the higher races of man, based on the fact that "in the lowest representatives of the order and those in which the cerebral hemispheres are proportionally the smallest, complete suppression of the last molar has occurred"; and as confirmatory evidence referred to the molar dentition of the dog M. $\frac{2}{3}$, the cat M. $\frac{1}{1}$, the hyena M. $\frac{1}{1}$, the otter M. $\frac{1}{2}$, and the seal M. $\frac{1}{1}$.

Illustrating the idea that the human dentition shows occasionally a reversion to the type of lower orders, Dr. Goddard presented a number of casts.

Casts 1 and 2 showed supernumerary molars. In No. 1 the first molars on both sides had been extracted, and the fourth on each side had erupted in contact with the buccal surface of the second and third. Cast No. 2 showed the third and a fourth molar both erupted buccally to the second.

Cast No. 3 showed three bicuspids (premolars) on each side in the lower jaw, a reversion to the lowest order of quadrumana.

The paper then gave the derivation of the names incisors, cuspids (canines), premolars, and molars, and quoted, also from Wortman, (*loc. cit.*) the definitions of the various classes of teeth.

The occasional reversion in the number of incisors in the human dentition was illustrated by several specimens. Cast No. 4 showed five incisors, three on the right and two on the left side. Cast No. 5 showed six. We are accustomed to call these supernumerary teeth, but they are really cases of reversion to the dentition of lower orders. This is strikingly shown in drawings Nos. 6 and 7, made from memory from casts lately in the possession of the writer, but which have unaccountably disappeared. No. 6 shows six temporary inferior incisors. The child from which it was taken was about five years old. No. 7 shows six permanent inferior incisors in the same jaw of the same child at about the age of seven years.

Cast No. 8 showed the first step toward suppression of the lateral incisor. The right lateral is peg-shaped, and, except its position, has no characteristic of a lateral.

Cast No. 9 showed the right lateral missing and the left peg-shaped, while No. 10 showed both laterals missing.

No. 11 showed the left lateral missing, while No. 12, of a man forty-five years old, showed both laterals missing and the third molars absent also. These two were especially interesting, because they are wife and husband, and their child, a boy of twelve years of age, has the same deformity as the mother, as shown in cast No. 13, the first instance the writer had met with in which father, mother, and child showed the same dental deformity. (See Figs. 1, 2, 3, which correspond respectively to casts Nos. 11, 12, 13.)

Cast No. 14 showed an attempt at suppression of a temporary lateral, for it was joined to the central, a double germ having been produced instead of two separate ones.

No. 15 showed a similar condition, except that the temporary lateral was joined to the cuspid.

FIG. 1.

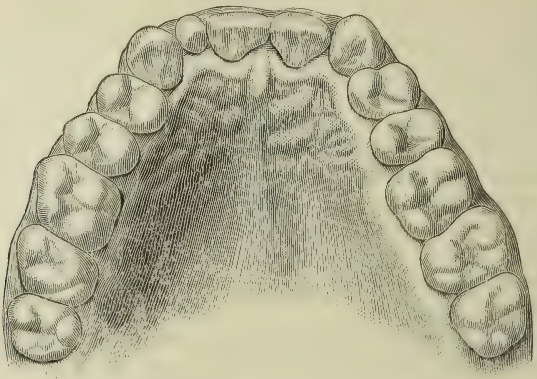


FIG. 2

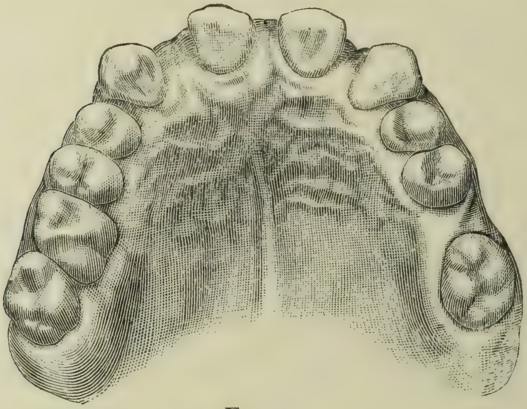
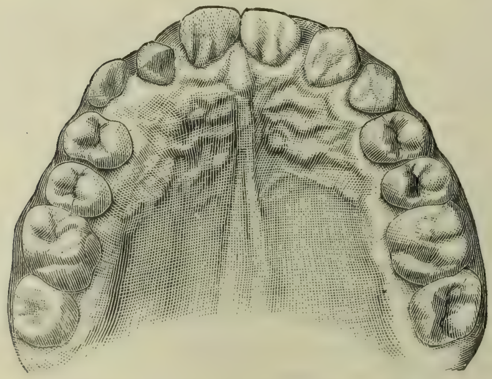


FIG. 3.



Cast No. 15½ showed five temporary incisors, two on the right and three on the left side.

An examination of casts Nos. 16 and 17 and other similar ones convinced Dr. Goddard that, excepting the third molar, the lateral incisor is out of line more often than any other tooth. It is found more often on the lingual than on the labial side of the line, the latter position being rare.

The cause for this is the crowding of the canine (cuspid) tooth. In many cases the four incisors will erupt normally, or perhaps in the segment of a circle slightly smaller than normal, and by the eruption of the cuspid the lateral will be crowded lingually till the cuspid nearly or quite touches the central incisor, or the laterals erupt so far behind the line of the central that the cuspids erupt by the side of, and often in contact with, the central.

The usual treatment is either to expand the arch or to extract a tooth posterior to the cuspid, preferably the first bicuspid, force back the cuspid, and move the laterals forward into place.

In treating these cases, one important factor is often lost sight of, —the position of the roots of the teeth. We many times find, after moving the cuspid outward or backward, that the crown has an unnatural appearance, is tipped too far out or too far back. The root apex is not in its normal position. It is nearer the root of the central incisor, and a line drawn between the apices of the roots of the cuspid is much shorter than one between the summits of their cusps. In such cases the crown of the lateral incisor, when drawn forward, presents an unnatural slant, the neck of the tooth not being as far forward as the cutting-edge. The apex of the root is manifestly posterior to its natural position. The inference is that the intermaxillary bone is smaller and narrower than normal, hence the anterior borders of the superior maxillæ proper are nearer together than normally.

This narrowness of the intermaxillary bone will account for the sharp nose, with narrow nostrils and small nasal cavity, noticed in so many persons. Is nature striving to create a new order of beauty by gradually decreasing the size of the intermaxillary bone, and thus narrowing the anterior portion of the face? *The lessening of the intermaxillary bone would in some cases have the effect of crowding the lateral out of position, as shown by these cases of irregularity, and in other cases of suppressing the lateral altogether.*

Shall we find the man of the future with the following dental formula : I. $\frac{1}{1}$, C. $\frac{1}{1}$, Pm. $\frac{2}{2}$, M. $\frac{2}{2} = 24$? Will our ideas of beauty and symmetry be so changed that a cuspid and central in contact will look better than when a lateral intervenes?

The paper also called attention incidentally to the occasional appearance in cleft-palate cases (as shown in casts presented) of a tooth resembling a lateral incisor, but which, from its position between the cuspid and the cleft, does not come under the accepted definition of an incisor, which is reckoned to be developed in the intermaxillary bone. Dr. Kingsley had expressed the opinion to the writer that such teeth, if not lateral incisors, were supernumeraries resembling laterals.

Dr. Talbot asked Dr. Goddard if he had ever seen a case of cleft palate in which there were not deformed teeth.

Dr. Goddard could not say that he had, but some were much more deformed than others.

Dr. Dean. How about the second superior bicuspids?

Dr. Goddard had never paid any particular attention to them specially, and said that a paper from Dr. Thompson on the subject of the bicuspids would be read at the meeting next week.

Dr. Dean said that the question asked by him had some relevancy to the subject, for the reason that the second superior bicuspids are usually rather smaller than the first. He had some cases in which they were decidedly smaller.

Dr. McCoy stated that he was one of those individuals who had only one second bicuspid. He had none in the lower jaw and only one in the upper, and no third molars, nor had his mother.

Dr. Jacobs had recently learned of a rather remarkable case of reversion in a calf which had upper incisors, and he wondered whether there might not be incisors in the fœtal calf as in some species of the whale, and if so, whether this might not be a case of persistence of the fœtal teeth.

Dr. Dean. It is a question as to what the future denture of man is to be. There appear to be evidences that certain teeth are in process of suppression, and an effort has been made to formulate some law by which their suppression is governed ; but so far the subject is so chaotic that, so far as he was aware, no law has been formulated or indicated. We find remarkable variations for which we cannot assign a cause. He thought it was the superior lateral which was disappearing, while the inferior maintains its own. With regard to the third molars, both above and below, there are numerous cases where they do not appear,—why, we do not know.

Dr. Bonwill had not read the paper, and would not attempt to discuss it before this meeting. The chairman had said he (Dr. Bonwill) saw everything from a mechanical standpoint. He could not see things in any other way, and no one could know anything about the articulation of the teeth without studying the laws which he had discovered, so that it would be useless for him to attempt to talk on the subject unless the audience could follow him for at least three hours, with the drawings. There is nothing in the world more scientific than mechanics, and when we as dentists get so far into medicine as to lose sight of mechanics, we may as well abandon practice. Cope says that certain reputable dentists have told him that the lateral incisor is sometimes missing, and he says the coming man will have no incisors. Now, the coming man must be more perfect than he is at present. The speaker had casts in his collection of several cases of missing incisors, some centrals and some laterals, and he had no doubt that on examining them any one would say the dentures they show are not so perfect as those we now recognize as normal. Geometry and mechanics deny these things. In 1858, when he discovered that the jaw formed an equilateral triangle, he saw the law of articulation as surely as Newton saw the law of gravitation in the falling apple. The articulation of sets of teeth is guess-work unless you understand the mechanical construction of the jaw. There is a law in this from which there is no variation except by retrogression.

Dr. Dean. Concerning supernumerary incisors in the upper jaw, it is recognized that they are frequently, if not usually, abnormal in shape, whereas in the lower jaw they are very well formed. He would like to know whether those shown in the drawing are centrals or laterals.

Dr. Goddard almost thought they are neither. They seemed to be between the two types in character. In the cast with six supernumeraries there are four which seem from their form not to belong there.

Dr. Talbot. As Dr. Bonwill has said, there are fixed laws which govern everything. We have the law of hereditary influence, from which we have atavism or reversion to the original type, and degeneracy, and we can't get around these laws. There is no deformity in man but can be duplicated in the animals. Sometimes monstrosities are born in the human family, as for instance, a child with two heads ; and we find such monstrosities among the animals and the birds, and even the snakes. Now with regard to neuroses and degeneracies, which are different, wherever we find these we find deformities. He had examined two men who were hung in Illinois. One of them had murdered his two sisters. He was an example of reversion of type. He had large jaws, with teeth firmly fixed, like those of the mound-builders ; he had no brain development, and his hands and feet were large like those of the anthropoid ape. The other was executed for the murder of his mistress. He was not well formed, and he inherited a nervous and irritable temperament. There were thus the two types of change shown in these men, the one backward toward an original type, the other forward toward the future man. In a lack of the full complement of teeth is shown a want of nervous energy to produce the normal number ; a superabundance is a reversion toward the animal type. With the present neurotic tendencies, what the future man will be will depend on several factors. If these tendencies are steadied from the animal side, he will remain as he is to-day. If the nervous influences prevail and he produces still more neurotic descendants, if the brain is developed to its greatest extent, he will become extinct, and before that time the hair and teeth will probably disappear if the brain is developed at the expense of the animal nature.

Malposition of the teeth does not come under the same head. This usually depends upon local causes. The teeth are frequently crowded before they are erupted. The reason for the suppression of the superior incisor is lack of use, dependent upon neurosis. The lower tooth is always moving, and gets its proper blood-supply, while the upper don't, which is why the upper teeth rather than the lowers are suppressed.

Dr. Goddard had nothing to say in closing the debate but to bring out the point which he endeavored to make in the paper, that decrease of the width of the intermaxillary bone may produce both the loss of the tooth (lateral incisor) and irregularities in its position.

Dr. Dean read a paper, entitled, "Some Pathological Notes on Neoplasms of the Maxilla," by Dr. Vida A. Latham, of Chicago.

Dr. Latham said that a pathological formation may be simply an excessive production of the normal structure, and is a morbid condition only in respect to the amount and arrangement of the ordinary tissues of which it is composed, or of the region in which it is situated. These are known as "homologous" growths, and form a large number of all the pathological growths throughout the body, and include the hyperplasias, exostoses, congenital tumors, and many growths of varying origin, such as the arthritic enlargements, formations following a rheumatic attack, or the chronic inflammatory enlargements due to long-continued irritations.

The main and most important class of neoplasms are those belonging to the "heterologous" class, in which the structural elements are different from the tissues in which they are situated or with which they are connected. The true distinction depends upon the histological composition rather than upon the gross external appearance or upon the clinical peculiarities. Certain growths consist of a tissue different from any found in the adult body, and therefore very confusing to the pathologist, and they have to be referred to some of the immature forms of the tissues, or to their derivatives ; in fact, to embryological tissues.

Growths of mesoblastic origin are usually regarded as of a malignant type, though the benign forms are found, as fibroma, etc. Granulation-tissue or embryonic connective tissue only exists in the body of the embryo as a transitory material, which produces another and entirely different material. If embryonic tissue reappears when no process of repair is going on, and accumulates in any great amount, it may undergo similar changes to those belonging to it in its usual and normal state. It is never a permanent tissue, but is always changing to other and different forms. When a new growth appears it exhibits a tendency to undergo further changes, either extension of disease, or more often a rapid decadence or retrogression of the tissue already formed ; and lastly, it may be combined with almost any form of tissue in the body.

Text-books on oral surgery and pathology convey erroneous impressions by classifying neoplasms of the oral cavity as ordinary types, but a careful examination with the microscope reveals the fact that they are much more complex and peculiar. The majority of the tumors of the maxilla and oral cavity belong to this mixed class. These growths are also much more common than is usually thought to be the case, particularly so in the region of the neck, reaching from in front of the submaxillary gland to the parotid, and surrounding the angle of the jaw. Nearly every specimen obtained from this region has been of this peculiar type of growth, bearing no resemblance to any fixed type of tissue, and having only an ordinary clinical history. The diagnosis made by the operator has in almost every case proved to be erroneous when the growth has been examined microscopically.

The commonest varieties perhaps are epithelioma and sarcoma, the latter usually a peculiar mixed form between the round-celled, spindle-celled, and osteo-sarcoma. Enchondroma undergoing sarcomatous degeneration is also met with.

Tumors of the salivary glands are almost always confined to the parotid, being very rare in either the submaxillary or sublingual glands.

The commonest type of the parotid tumor is composed of a mixture of cartilage, myxomatous tissue, a varying quantity of connective tissue, and ill-formed glandular acini. Growths of this nature are often called "parotid glandular tumors" or "adenomata," but it is quite rare to find a growth the bulk of which is composed of true gland-tissue. The cartilage of these tumors is hyaline, and it is by a mucoid degeneration of its stroma and that of the fibrous tissue of the growth that the myxomatous tissue is produced. Sometimes there is a considerable mixture of sarcomatous tissue, and a corresponding difference in the rapidity with which such tumors develop. They appear in middle life and are found in either sex. They occur most often in that part which overlaps the lower jaw, are usually encapsulated, and when small adhere but little to surrounding parts. They attain large size if let alone, and may cause death by encroaching upon the pharynx or large vessels. The lymphatic glands are seldom affected, and although the growths may recur locally after removal, they seldom or never become disseminated.

Malignant growths are happily rare in the parotid. About the only growth which occurs in the submaxillary gland is made up of cartilage, and even this is rare. Tumors of the maxillæ possess so many distinct features as to almost require a separate description.

Epulis is a loose term often applied to any tumor which appears on the gum, but is best limited to the fibromata. It usually develops from periosteal tissue, and is occasionally attached to the periodontium, and very often extends into the alveolus. It necessarily compels the extraction of a tooth or teeth, and excision of a portion of the alveolar margin. A simple diffuse epulis is usually only a thickening of the gum.

Myeloid sarcomata are often included as myeloid epulides growing within and expanding the jaw-bone, presenting rounded, tense, and elastic swellings, often feeling suspiciously like cysts, and generally found in young people. Other varieties of sarcomata occur within the jaw-bones, and also within the antrum. The cells are round or oval, the growths soft and rapid in development, tending to extend all around and to fungate through the skin, affecting the lymph-glands and so disseminating.

The distortion of the antrum and its related structures is too well known to require description. Any tumor in this region tends to distend the cavity in this way, but malignant tumors do so in a more typical manner than do the benign growths. Fibro-sarcomata are found in the inferior maxilla (mandible), not very malignant, and when completely removed with the bone seldom recur.

Carcinoma are most often found in the antrum, and develop from the epithelium lining the antral cavity. They are rapid in their course, affect the glands, and rapidly disseminate, and are usually found in elderly people.

Multilocular cystic tumors, so called by Mr. Eve,* and known as "cystic epithelioma," stand in the position of a mixed growth, a solid and a true cyst. They are most common in the inferior maxilla, and are endosteal or central of growth, and possibly originate by an ingrowth of the epithelium of the gum, following caries or traumatism of the teeth. They occur at any age, but usually between twenty and forty, are slow in growth, and may take years to reach any size. They are usually not malignant, and seem not to affect the glands or disseminate. The bone is usually expanded on its inner side, and is very hard to the touch, sometimes elastic and crepitant. The teeth loosen, fall out, and a sticky discharge comes from the alveoli.

Microscopically the bone shows expansion, the cavities are filled partly with a solid growth of a soft, fibrous, or fleshy material, partly by serous or viscid fluid. The septa dividing the cysts are often incomplete, and are either fibrous or bony.

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* *British Medical Journal*, January 6, 1883.

Periosteal cysts are situated beneath the periodontium, generally inflammatory in origin, and are found in connection with carious teeth or with imperfectly extracted roots. They are very painful.

Antral mucous cysts must be differentiated from malignant growths, as they produce a similar distension by their slow growth, fungation, and, as the bone thins, the presence of fluid is soon detected.

Dentigerous cysts and odontomes are quite well described in our dental surgeries and pathologies.

Diffuse osseous growths of the antrum are rather peculiar *in that they diffuse over the whole area of the antral wall;* we have no definite tumor, but a general thickening of the whole bone which incloses the antrum, and a gradual obliteration of the sinus by the new bony formation. It may be confined to the antral cavity or may extend to the superior maxilla. The growth is slow, occurs in youth, and is benign.

Cartilaginous tumors of the superior maxilla are extremely rare, and usually combined with sarcomatous elements.

Sarcomata include the fibro-cellular, the mucous tumor, and the myeloid of English surgery, nearly corresponding to Paget's recurrent fibroid.

The best classification of this group is perhaps a strictly pathological one, after Billroth.

1. Round-celled sarcoma, granulation-sarcoma (including glioma), consists of mesoblastic corpuscles ; the intercellular substance is homogeneous, striated, reticulate, and varies widely in amount. 2. Spindle-celled sarcoma. The cells are usually well marked ; intercellular substance absent or scanty, homogeneous or fibrous. The most recurrent sarcomata contain this tissue, but do not always recur. 3. Giant-celled sarcoma, myeloid, has the general structural elements of one of the other varieties, and has in addition many large multinucleated cells. 4. Net-celled sarcoma, mucous sarcoma. This is not *exactly* like the myxoma. Myxoma are sarcomata of various kinds, and are similar by having a gelatinous appearance. Net-celled sarcomata contain stellate cells with long processes and gelatinous intercellular substance. 5. Alveolar sarcoma are very rare. 6. Melanotic sarcoma may be combined with alveolar granular tumors, secondary to epithelioma of the lip or tongue, become adherent to the lower jaw in the later stages, but must not be confounded with growths originating in the bone itself.

The superior maxilla seems to be most often involved, and usually recovers itself on account of its high degree of nutrition.

The usual result of carcinoma is a recurrence, after about one to three years, usually in the cicatrix.

The diagnostic signs of antral growth are as follows : When springing *from the interior* of the antrum, the orbital, nasal, palatal, and buccal walls of this cavity are expanded according as the tumor grows upward into the orbit, inward into the nostril, downward into the mouth, or outward upon the cheek, causing a prominence of one side of the face. In many instances it grows simultaneously in all these directions, producing exophthalmias, obstruction of the nostril, prominence of the cheek, and bulging of the roof of the mouth. When springing from the anterior surface of the superior maxilla, it causes a projection of the cheek, dipping down between the gums and the soft structures of the face. It may extend backward into the interior of the antrum by increase of size, thus secondarily implicating that cavity.

When springing from behind the superior maxilla, the upper jaw is first pushed bodily forward; but as the antrum becomes secondarily involved, any of the walls of this cavity subsequently become expanded and rendered prominent.

A serious affection of the gums appears in a more innocent garb, apparently a mere ulcer. Dental surgeons are more apt to see it in its earliest stages than are surgeons. A sore appears, perhaps awakened by a carious tooth; it does not heal kindly, but exhibits a tendency to extend; its borders become hard and thick; its base soon adheres to the bone beneath: this is cancer.

"Bone is never the seat of cancer primarily." We now know there are but two locations in the superior maxilla where cancer is first encountered,—the first, as above, upon the gum; the second in the antrum of Highmore. In each it starts as an ulcer, eats its way into the bone, and never appears as a distinct tumor.

The sore is found upon the gum. Its thick edges and firm, immovable base characterize its malignant infiltrating tendency. Dentists cannot have these facts too strongly impressed upon them. Carcinoma of the body of the superior maxilla conceals its true nature at first, and, except by a careful person, is not recognized until extensive destruction of bone has resulted, possibly an opening made in the oral, nasal, or orbital cavity, and it is beyond operative relief.

Butlin has removed the upper jaw within seven weeks of the first signs of the disease, only to find the bone entirely destroyed and sinuses burrowing into all the surrounding parts. Thus we see the necessity, when malignant disease is suspected, for examining not only the mouth, nose, and orbit, but even the throat; and here comes the necessity for broad medical and dental education combined in the efforts of thorough dentists and surgeons. Professor C. Heath says that the attachment of any growth to the roots of extracted teeth should excite suspicion that a serious disease is present in the antrum, and a microscopical examination should be made.

Dr. Latham closed with regrets at being unable, owing to lack of time, to present the subject more fully, and with the request, in order that it may be further elucidated, that members of the profession would kindly collect and themselves examine such specimens or send them to her for that purpose.

Dr. Talbot asked any members who possessed specimens in the line of Dr. Latham's paper to send them to her.

Dr. Jacobs said that some seven or eight years ago he had studied the structure of tumors considerably, but had done very little work in that direction lately. He therefore did not care to discuss the paper further than to confirm it so far as he knew, and to say that Dr. Latham is the hardest worker he ever knew, and he had no doubt of the correctness of everything she says.

A paper by Dr. A. E. Baldwin, of Chicago, entitled, "Random Thoughts on our Specialty," was then read. An abstract follows.

In taking a retrospective view of our professional work and advancement during the last four years, one cannot help a very strong feeling of disappointment, in spite of the very extravagant claims of the average dentist. In such a retrospective glance we must keep in mind that the effort of all truly scientific minds is toward that which is strictly scientific, and all will concede that the nearer we approach that exact position the more incumbent it becomes upon us to make our so-called scientific work truly so by making it clearly demonstrable. To place our specialty in such a position requires us to develop a class in our branch of professional work who will ever and always think for themselves on any and all subjects.

What is uppermost in the writer's heart is that the very small number of our brethren who will think for themselves, and not say "amen" to anything simply because some professor says so, but will weigh with physiological, anatomical, histological, pathological, or etiological scales these so-called facts, and then indorse or condemn as the scales may determine,—that the number of these may increase and multiply until it will be dangerous for one to stand up before them, in public or private, and feed them chaff calling it wheat, in the hope that the statement will pass unquestioned.

We should learn to think for ourselves. We may not have time or opportunity for as much original investigation as we could wish, but if an original investigator lucidly explains all the processes of the experiments, we will be in possession of all the "premises" from which he draws his conclusions, and may view them far differently than he does.

In glancing over our journals, the same thing is noticed,—the immature thought often stated as a certain conclusion and so accepted. If we might secure a journal that in each issue would contain nothing but demonstrable truths, or plain, honest premises from which to form our conclusions, how small and choice such a work would be.

Then, again, there are many in our ranks who are many times satisfied to do, under certain circumstances, less than the best they can do. This vitally concerns us all, for to slight an operation is to bring reproach upon ourselves as a whole. There is, of necessity, a great difference in the various methods as practiced by different operators, but we should not vary from well-established rules of operation unless we have well-grounded physiological reasons for believing that the experimental method is an advance upon the old. How few among us know the reason each time for what they do, or even try to solve the problem. If we, as specialists, expect a healthy and generous growth in mental and physical ability, it must come, very largely at least, not only by systematic thought and close study of books, but by training our powers of discrimination so as to be able to distinguish the true from the false.

Dr. Talbot said that there was only one point in this paper which he wished to emphasize, and that was the independence of thought which Dr. Baldwin urges. Don't take everything which is said by the voice of authority to be finally settled. Weigh everything, and judge it by the best knowledge you have. We as dentists labor under one disadvantage. Our professional training is narrow. We are taught one branch of medicine, and we don't get the broad, liberal foundation which we ought to have. If we had a thorough training, not only in medicine but in the sciences, we could reason upon all subjects; we could decide for ourselves whether the arguments of a paper were correct or not.

In closing the session, he wanted to say that he was more than gratified with the papers which had been read and the discussions which had been evoked by them. Taking into consideration all the circumstances, we can congratulate ourselves on having had a very successful meeting of the section. The sessions have been well attended, and the numbers in attendance have been constantly increasing. We never have a large attendance; in fact, we don't want mere numbers, unless they enter actively into the work. He was one of the originators of the section, which was instituted for the purpose of educating the medical profession in dental subjects; and all must certainly admit that they have become interested in us, and they read our papers in the medical journals. He believed that we would in fifty or a hundred years be recognized as an important part of the medical profession.

The section then adjourned.

MIDWINTER FAIR DENTAL CONGRESS.

(Continued from page 833.)

THIRD DAY—*Evening Session.*

THE congress was called to order at 8.15; President Younger in the chair.

Dr. Earl D. Eddy, San Francisco, read a brief paper on "Pental," prefacing the reading by a few remarks explaining that he had thought it well to recall briefly to the minds of the members of the congress some of the more important points with reference to pental previous to his clinic with it. The paper sketched the history of the drug, formerly known as trimethlethylene, and later as isoamylene, from its first preparation by Cahours, in 1843 or 1844, by the direct action of sulfuric acid on amyl alcohol, which resulted in an impure product containing a small residue of fusel oil, which could not be eliminated. From 1844 to 1858 it was used experimentally as an anesthetic, and was the cause of many fatalities. From the latter date there is no mention of the drug as an anesthetic until, in 1891, Professor J. von Mering succeeded in producing a chemically pure article by reducing the amyl alcohol to a hydrate and then heating with an acid. The paper then gave the physical properties and physiological effects of pental (C_5H_{10}). The writer recognizes the element of danger in all anesthetics, which should never be administered carelessly, no matter how safe they appear to be. That pental is less likely to produce these danger-signals than any other substance heretofore used is certain to his mind, as the result of experience with pental, gas, chloroform, and ether. The chief advantages of pental are (1) the absolute certainty of a painless operation; (2) rapidity; (3) immediate and complete recovery of the patient; (4) simplicity.

Dr. W. G. A. Bonwill, Philadelphia, read a paper entitled "A New Era in Dental Progress." This paper, the consideration of which occupied the remainder of the evening, will appear, with the discussion, in a later issue of the DENTAL COSMOS.

FOURTH DAY—*Afternoon Session.*

The congress was called to order at 2.50 P.M. by President Younger, who shortly called Dr. J. A. W. Sundborg to the chair.

Dr. J. W. Davy, San José, read a paper entitled "Aromatic Sulfuric-Acid Treatment for Abscesses."

Dr. Davy's paper was a plea for the use of aromatic sulfuric acid in the treatment of alveolar abscess, upon theoretical and clinical grounds. While sulfuric acid (H_2SO_4) energetically destroys tooth-structure, the aromatic preparation has no effect upon living structures, but acts energetically upon dead tissues. It is in effect a twenty per cent. solution of the stronger acid, which alone would give a mild escharotic effect, but it is reinforced with the stimulating properties of ginger, cinnamon, and alcohol, which are very necessary in the treatment of abscess. If we simply destroy the pus-sac, and do not assist nature to carry off the *débris* and fill up the cavity formerly occupied by the pus-sac, our work has not been completed. In the case of abscess, where there is a more or less carious condition of the alveoli, the carious matter is dissolved by the action of the sulfuric acid, and the healthy cells are more markedly stimulated to action by the ginger, cinnamon, and alcohol, thereby aiding nature to overcome the pathological condition.

Where a carious condition exists, an opening should be made through the gum and alveolar process, thereby securing good drainage. The writer does not approve always of filling the root-canal until healthy granulation of the parietes is secured, more especially when the pulp has been long dead. Where the enamel-walls are thin or frail they should be protected from the action of the acid by a lining of chloro-percha, quite thin. When the softened dentine is allowed to remain, provided it covers the enamel-walls, it is all the protection necessary if the acid action is neutralized before the patient is dismissed.

Dr. Davy cited cases to prove the efficacy of the aromatic sulfuric-acid treatment. In its application, the syringe and broaches should be of non-corrosive materials, as gold, platinum, or platinum-iridium, so as to avoid not only the risk of corrosive agents, but of discoloring the tooth-structure. The objection that aromatic sulfuric acid destroys clothing and napkins when it comes in contact with them is a trifling one, and readily overcome by the application of a little ammonia to the stains, or better, by the free use of absorbent cotton to prevent them.

Dr. A. C. Hart, San Francisco, read a paper entitled "The Pathology and Successful Treatment of Periodontal and Endodontal Tumors, commonly called Alveolar Abscess and Fungous Growth of the Pulp." An abstract follows.

Dr. Hart did not know but that there were others whose practice was the same as his, but the profession at large were practicing and teaching methods for the treatment of these conditions which are at their best tedious, uncertain, and cruel.

The term "alveolar abscess" is a misnomer. The abscess, blind or fistulous, attached to the end of the root of a tooth has no connection with the alveolus. He believed it to be an abnormal, degenerate enlargement of the dental nerve and periodontium where they formerly entered the tooth, and always indicative of the death of the pulp. It is never a growth from the surface or substance of the alveolus, as some assert. These sloughing, spreading, and disintegrating patches along the sides of the root are forms of pyorrhea alveolaris, not of abscess. He had not met with a single case of well-defined pyorrhea alveolaris in either devitalized or abscessed teeth that had its origin since the death of the tooth, and he would be pleased to hear from the profession as to their experience, as he believed the exception noted of great importance, and well worth attention and further investigation.

In an abscessed tooth we always find the gum closely adhering to the tooth, while in pyorrhea alveolaris the periodontium adheres to the tooth only, having in most part lost its connection with the gum and alveolus.

An abscess has the vitality and organization of a tumor, and should rightly be classed as such ; for we find the sac isolated from the surrounding parts by distinct investing layers of tissue, and, although continuous with the natural parts, abruptly circumscribed in the greater part of its extent. The ease with which the sac is removed in the extraction of the root is *prima facie* evidence of the correctness of the above view, which exactly corresponds to the definition of a tumor as given by Paget. The sac is an independent growth, with an abundant blood-supply, and will often continue to grow and discharge its "manufactured fluid" for years after the root has been extracted. One case of fistula had continued to discharge for fourteen years after the extraction of the root. It might justly be regarded as belonging to the class of tumors known as fibro-cystic. Tumors are said to have their origin from some form of inflammation in which these growths agree, being due in many cases to inflammation induced by bacteria and foreign matter of an exciting nature. The periodontium and pulp are inseparable, closely connected during the development of the tooth, and always by the fibrillæ and by the tissues entering the apical foramen in the adult. This intimate relation had led him to coin the word "endodontium," which he should hereafter use when referring to the pulp, as he thought the term a good one, and hoped it would receive the approval of the profession. Every one admits the word pulp to be unscientific and ambiguous.

He believed it incorrect to say that the endodontium is the life of the tooth, as we all know with what tenacity the periodontium adheres to the endodontiumless tooth, or to even an implanted tooth, showing that the fibrillæ are still alive, even though the endodontium has been removed. May not the vitality displayed in tumefied pulps, or endodontal tumors, be partly due to enlarged apical foramina, giving an abundant blood-supply and connection with the periodontium?

The apparent relation between alveolar abscess and tumefied pulps has led him to consider them together, as he believed them to be derived from a common cause, chronic inflammation, induced by matters of an exciting nature.

The *modus operandi* for the treatment of peridental tumors is equally adapted to either of the forms, blind or fistulous. If the patient is suffering pain, and considerable swelling is present, the soreness of the tooth will necessitate much care in treatment. With these conditions present, five to twenty grains of phenacetine have been found very effective in quieting the patient and as an antipyretic and anodyne. Freely lancing the gums, and in some instances drilling through the alveolus to the apex, as preliminaries, wonderfully facilitate the operation, as the pain is greatly lessened and often removed. The rubber-dam should then be adjusted, the tooth carefully dried and given support, if possible, oxyphosphate, modelling compound, pink gutta-percha, or ligatures being recommended. An opening is next made, if not already present, with a spear-pointed drill, that shall afford the greatest facility for reaching the root-canals. An Evans root-canal drier with an extremely fine point is next inserted in the opening made into the pulp-chamber, and the canal cleared of its contents as much as possible. The drying of the root-canal with the root-drier tends to create a vacuum which increases the capillarity of the canal, thus drawing into it a portion of the sac's contents. Heat thus applied, in acute abscess, acts both as a counter-irritant and anodyne, the importance of which cannot be too highly estimated

Root-cleansers and reamers are next used in much the same manner as recommended by Dr. George Evans, of New York. Some few operators state that they do not ream out canals, but careful investigation seems to demonstrate that the majority even of these, in obtaining an entrance to a canal, enlarge the orifice and to some extent really ream out the canal. The reaming, then, is with them only a matter of extent. As a rule, in proportion as root-canals are properly—not excessively—reamed and opened up, so are subsequent operations on them satisfactorily performed. Ordinarily but little reaming is necessary, as the roots of teeth having these cystoid formations are generally possessed of unusually large canals and apical foramina, but if the canal is obstructed or small, it is opened sufficiently to get an explorer through. He has not hesitated in cases in which the curvature of the root was so great as to render an opening through the apex impossible to drill through the side of the root, as near the apex as possible, to get direct communication with the tumor. The canal should now be thoroughly dried with bibulous paper and flooded with the dilute solution of hydronaphthol in absolute alcohol (ten grains to the ounce), and the root-drier used to completely vaporize the solution.

Carbolic acid, in connection with lactic acid and trichloracetic acid, he had found of inestimable value in these cystoid growths. Carbolic acid is in reality more closely identified in its composition with the alcohols than the acids, and is of three recognized grades, Nos. 1, 2, and 3. The acid ordinarily found in drug-stores costs from 45 cents to 65 cents per pound, whereas the purified acid (Calvert's No. 1) costs $2.00 per pound, and is kept by few druggists. Most druggists will tell you that there is little difference except in price and name, but experience had taught him that a cheap article is dear at any price, and he was inclined to the opinion that a great per cent. of his cures had resulted from the use of Calvert's carbolic acid No. 1, full strength,—*i.e.*, with just enough water to render it liquid,—pumped through the canal and out through the fistula, cauterizing this tumefied tissue as effectually as the hot iron, and strangulating the circulation at once. It coagulates the albumen almost instantly, and expends itself and exhausts its force right there, and leaves none to be absorbed into the system. Pumping carbolic acid through the tooth and out through the fistula is never followed by any troublesome inflammation, as inflammatory action cannot take place in a tissue destitute of circulation. Carbolic acid in the strength named combines the properties of a cauterant, local anesthetic, and antiseptic.

Nature seems to have provided for just such emergencies, in the great abundance of giant protoplasmic cells, whose function is to absorb and repair broken-down tissue ; and as our treatment with the carbolic acid has rendered the tumor into a digestible pabulum for the giant protoplasmic cells, they set to and devour it with an apparent relish to themselves and satisfaction to our patients.

The carbolic acid left in the canal should then be vaporized with the root-drier, and the canal saturated with a solution of equal parts of oil of cloves and oil of cinnamon. This is then vaporized in like manner, and the canal wiped out with chloroform. The action of heat secured by the use of the root-drier is of great importance in the sterilization of the partially septic contents of the tubuli. It also has a tendency to slightly enlarge the tubuli, making them easier of medication, as effected in the vaporization of the medicines suggested.

Chloro-percha is then pumped into the canal, and if the abscess be of long standing, out into the fistulous tract, and the root is filled solidly to the apex with gutta-percha. In the event of there being no fistula present, one has to use his own judgment as to the advisability of making one. If there has been no soreness of any consequence, he proceeds with the work of cleansing and immediately filling the root-canal ; but if there is considerable soreness and pain, an opening is effected as follows : With a small swab, made by wraping a few shreds of cotton around a cotton-carrier, a drop of trichloracetic acid is placed on the gum over the apex of the root being treated. By gently twisting the carrier and applying more of the acid, you can effect an entrance down to the alveolus, without shedding any blood. A spear-pointed drill is next placed in a carrier for hand instruments, and slowly an entrance is drilled through the alveolus to the sac. Carbolic acid is then carried on the swab, so as to thoroughly permeate the tumor, and if a fistula be present to cauterize its whole length. Where there is reason to believe that necrosis is present, the cauterizing of the fistulous tract is followed by enlarging the opening, to more certainly get into direct contact with the necrosed bone. The tract is then thoroughly syringed out with pyrozone, and concentrated lactic acid is pumped in, to thoroughly permeate the necrosed bone. A small tampon of cotton, saturated with camphophenique and aristol, is left in the opening for two or three days, so that any discharge may have means of escape. It is then removed, connective tissue having begun to form in the fistulous tract, which will gradually heal up, leaving no trace of the opening.

Dr. Hart had treated over three hundred and fifty cases of periodontal tumors in both the upper and lower jaw, without in a single instance being unable to allay the pain, stop the progress of the disease, or to effect a cure, treating with equal success abscessed third molars of the lower jaw, and single-rooted teeth of the upper. The most difficulty has been experienced in treating the upper first bicuspid.

With regard to endodontal tumors, the paper quoted from Drs. Jas. Truman, J. E. Garretson, and F. J. S. Gorgas, to show the difficulties usually encountered in these cases, and concluded with a description of his method of treatment, which is to adjust the rubber-dam and dry the tooth. Trichloracetic acid is then applied until all the tumor has been removed from the cavity of decay and pulp-chamber. To the cauterized end remaining in the root-canal arsenic is applied on cotton in the same manner as described by Dr. Jas. Truman, who says, "In preparing my arsenic I take one drop of carbolic acid, four times the amount of iodoform as arsenic. I combine these with a piece of cotton the size of a pin's head, apply to the pulp, and cover with a metal cap of tin, as you would in capping a nerve, and seal with oxyphosphate." The rest of the pulp is removed in four or five days, just the same as is ordinarily done, and the canals are filled as described in the case of abscess. He has had seven consecutive cases, and has yet to record a failure.

Dr. J. L. Asay, San José, in opening the discussion on the two papers, said that in a case which came into his hands where the death of the pulp had resulted in abscess with a fistulous opening out under the chin, the tooth had been filled and an attempt made to amputate the root, which was somewhat of a failure. Pus had been oozing from the mental orifice for two months. There was trouble not only from the abscess itself, but from caries of the bone along the whole tract. Medication seemed to have no effect, but as the first step toward thorough cleanliness he washed out with hydrogen peroxid for some time, and later syringed down through the root-canal a dram of aromatic sulfuric acid and let it run out of the fistulous opening. This treatment was continued for about a week, and in ten days he filled the tooth, and there had been no trouble since. Other cases in which he had had similar results had decided some things for him, and he had abandoned the one, two, three mixture, iodoform, eucalyptus oil, etc., and had settled upon the use of aromatic sulfuric acid, which had come down to us from antiquity, and which he believed would be the treatment of the future for alveolar abscess. He knows of nothing else which is so rapid and sure in its results. The mere fact that Dr. Abbott does not use it because it may soil the dress of his patient should not count. For himself he would rather soil the dress and make the patient a present of a new one than have an alveolar abscess on his hands which refused to yield to treatment. If you can pump the aromatic sulfuric acid into the hypertrophied portions of the membrane, you very soon get rid of the abscess, but if you use the one, two, three remedy, etc., you will never get rid of it. After the abscess itself is abated, you must never let the orifice close until the entire tract is cured. The rule is to see that the granulations of the new tissue come from within outward, or else you will have to open it up again. Some time since he thought chloro-percha the best material with which to fill canals in these and other cases, but he has given it up and now uses the Australian oil of eucalyptus with the gutta-percha dissolved in it. He uses the Australian oil because the ordinary oil will not hold the gutta-percha in solution. With the Australian preparation there is no shrinking of the filling; you get the benefit of the antiseptic quality of the oil, and there is perfect closure of the foramen.

Dr. L. Van Orden, San Francisco, could not quite indorse the opening portion of the paper, which called attention to the new name which its author proposed for the tooth-pulp, and what has been called fungous growth of the pulp,—endodontium and endodontal tumor. It is not so long since the old word nerve was superseded by the term pulp. We haven't yet thoroughly learned to use the latter, and we had better stick to it till we are perfectly familiar with it. He had learned from a friend in the East that it was customary there to give up teeth in which this fungous growth of the pulp was found, and extract them; but there is very little difficulty, with the aid of trichloracetic acid, in removing the pulp without extracting the tooth. An interesting fact to be considered in this connection is that nature is very kind. Instead of having the pulp die in these young teeth, in which case decay would have progressed to the apex, this process which has been described is set up, and we do not have decay in the canals where these fungous growths are found. As to opening through the alveolar walls in abscess, that is a more merciful and quicker method than attempting to treat through the root-canal. To prevent closing of the orifice in the gum he would recommend, instead of the drill, the use of a small tubular knife, which removes a small section of the gum, and then the opening can be enlarged with a bur. He does not think it necessary to interfere with a root-filling very often. He had removed a canal-dressing of cotton which had been in position fourteen years. That was not his method of filling canals, but it is well, before ridiculing the plan, to consider such facts. It may be well to at least leave cotton saturated with the proper medicament in the canal for a few hours or even days before closing permanently.

Dr. E. Parmly Brown, New York, expressed his belief that an abscess was in the nature of a foreign substance in the tissue, and it must be got out. The question always is, What is in there? If you diagnose a nest of microbes, that is one thing. If you don't know, don't do anything until you have diagnosed what it is. He did not care what was used to do the work, so the foreign substance was gotten out. Aromatic sulfuric acid does not disinfect; it simply dissolves dead bone. He uses Calvert's No. 1, then oil of cloves, and oil of cinnamon. The oil of cassia, as usually sold, is impure and its results uncertain. If there is no dead bone, don't use the aromatic sulfuric acid, but use the others named, and just as soon as you have gotten the irritating causes out you have a cure. As to immediate root-filling, the case is like that of a cave giving forth noxious vapors, and just as soon as you have it cleansed and sterilized you want it plugged up. There are no lesions of the jaw which cannot be cured, up to a certain point. Of course, the dead cannot be brought to life; but there are no roots of teeth, unless dead and poisoning the circulation, which cannot be cured and made useful. He has a tooth the crown of which was broken off thirty years ago, and the root of which had an abscess. The root now bears a crown. The abscess was cured, and there has been no further trouble with it.

Dr. W. J. Prather, Seattle, Wash., had found it more satisfactory to use floss silk in treating these cases than cotton, because it was easier to handle.

Dr. George H. Chance, Portland, Oregon. In hypertrophied conditions of the pulp, why not immediately lift the pulp out with a little scalpel, to relieve the tension, and deplete the patient?

Dr. A. F. Merriman, Jr., Oakland. There are more ways than one of treating abscess. Use your own way if the results are satisfactory. A case came into his hands in which three teeth had been abscessed more than a year. One of them had been extracted and replanted after treatment, but the abscess was still there. He removed a poorly inserted amalgam filling from the root of one, and treated the abscesses with hydrogen peroxid, and sealed within the canals a weak preparation of iodoform. In three months he filled the roots, and three years after there had been no further trouble.

Dr. L. L. Dunbar, San Francisco, was much interested in the first paper, and in defense of the antiseptic action of sulfuric acid he stated that he thought a twenty per cent. solution of sulfuric acid would have an antiseptic effect. A fifty per cent. solution has been recommended for root-disinfection, and even dilute solutions have been claimed to act. He has very little use himself for the aromatic form, but he has used the dilute officinal acid as recommended by Dr. Callahan. He was particularly opposed to the use of reamers run by the engine in root-canals, as recommended in the second paper, especially the Gates-Glidden drill, as he thinks eighty per cent. of those which have been used are buried in the roots. They make beautiful plugs for root-canals; they don't corrode. One of the best means for opening up a root-canal are the Donaldson pulp-canal cleansers, which are practically reamers, and which are tempered very tough. They are excellent for the purpose, particularly after treatment with dilute sulfuric acid. Twenty-four hours after the application of the sulfuric acid, the walls are softened so that the canals are easily cleared out. Sulfuric acid will sterilize the hair-like root-canal. There is an instrument for vaporizing the iodoform crystals and driving the vapor into the canal. He did not know how it resulted, but the vapor goes in. He had never seen cotton kept in a root-canal for any length of time that any one wanted the second sniff at.

Dr. Brown. If you put enough sulfuric acid into the canal, you will cremate its contents. Sulfuric acid does just as a fire would, but it does not fill up the tubuli.

Dr. C. S. Lane, Oakland, would like to ask something about the fluid silicate of soda. It turns to glass. He would like to know whether any one present has had sufficient experience with it to speak with confidence as to its value. It seems to have the property of converting other things with itself into glass.

The discussion was closed, and a paper by Dr. Louis Ottofy, of Chicago, entitled "Statistics and Observations on the Removal of the Natural Teeth," was read by title.

In this paper Dr. Ottofy presented a tabulated statement of the teeth and roots extracted by him, some 5504 in number, showing in each case the particular tooth and the cause for which it was extracted. Of these, omitting 98 not surely recorded, leaving in round numbers 5400, less than 600 were extracted for other causes than caries. It is safe to conclude that the largest number of extractions recorded as roots and carious cavities might have been prevented by judicious care at the proper time. In many cases, lack of education was the prominent factor ; in others, the want of means. The former should not exist in an educated commonwealth, and the latter should be provided against by the establishment of free dispensaries. The total extractions because of diseased conditions other than caries, such as absorption of roots, salivary calculus *per se*, necrosis of roots, exostoses, mechanical abrasion, etc., was 23, while pyorrhea claimed 34, pericementitis 73, irregularity 102. Under senility or looseness (351) are the deciduous teeth extracted to make room for their successors. 2357 were remnants in the shape of roots. Of approximal cavities as causes there were 1325, crown cavities 935, buccal 189, labial 20.

It is impossible to surmise the damage that must result from indiscriminate extraction, many of those recorded in these tables having been extracted under protest, in many other cases which offered extraction being refused point blank.

As a means of overcoming the common ignorance on dental subjects, Dr. Ottofy suggested the printing of leaflets in various languages, under the authority of some prominent dental organization, each leaflet to be confined to a single subject, and to be given to persons in need of the particular information it contained. This he regarded as a more judicious way than that usually employed of treating the entire range of dental topics in a single volume.

The paper closed with some interesting statistics drawn from the records he had presented.

President Younger at this point resumed the chair, while Dr. Russell H. Cool, of Oakland, read a paper on "Implantation," in which he strongly indorsed the practice as introduced by Dr. Younger. The paper was illustrated with casts showing the results of implantation.

Dr. Younger said he was gratified when Dr. Cool told him he was going to read this paper. Implantation is now nine years old, and many of the first teeth implanted are still in excellent condition. He felt that the practice should now be regarded in the same respect as other established operations. But implantation had progressed further than he thought it would when he first brought it to the attention of his *confrères*, as in the implantation of roots for supports for crown- and bridge-work, a later development which he had not at first thought of. He had been made happy by the kind remarks which so many have made concerning the practice. Dr. Jacobs, in a paper read before the Oral and Dental Surgery section of the American Medical Association the previous week, had entirely proved the persistent vitality of the pericementum of extracted teeth. He showed that this cell-structure might retain vitality for quite a long time. It was an important fact to those who practice implantation that the theory advanced to account for the fact that teeth long extracted were retained in the jaw in apparently the same manner as fresh specimens was sustained by scientific evidence.

The subject was passed, and Dr. C. L. Goddard, of San Francisco, offered the resolution for the establishment of the Pacific Coast Dental Congress reported in the DENTAL COSMOS for July. The resolution was adopted, and the election of the committee provided for was made the special order for the next day at 5 o'clock P.M.

Dr. F. W. Bliss, Santa Cruz, read a paper entitled the "Ideal Porcelain Crown," which was described as an improvement on the Downie crown, constructed as follows:

Grind the root down nearly to the gum-margin, leaving a perfectly smooth surface, beveling the anterior edge at an angle of forty-five degrees, nearly to the root-canal, and paralleling the sides with Evans root-trimmers. Fit accurately a platinum band, No. 32, U. S. gauge, to extend one line under the gingival margin, and trimming upper edge to contour of the gum. Remove and solder upon the posterior two-thirds of the lower edge a bayonet-shaped piece of platinum, return the cap just described to the root, and adjust the loose anterior portion of the cap to the beveled edge. Remove and solder. Select a plain plate-tooth, grind to fit under the anterior part of cap, countersinking the front upper edge so that it will project materially beyond the bottom of the cap. Fit round or triangular iridio-platinum wire to the canal, and make a hole, smaller than the wire, through the bottom of the cap on a line with the canal, and drive the wire through it into the canal. Place the tooth in position, twisting the pins around the post. Remove the whole, keeping all parts in position, place in the furnace without investment, and solder with pure gold. See that the crown fits properly, back up with Downie's porcelain body, put into the furnace and fuse. In the first baking, the body will shrink, when more can be added, covering the anterior portion of the band, but when again baked the porcelain will fuse to the platinum and the tooth, making a strong and natural piece of work. A miscalculation of color in the body can be remedied by grinding off and trying again. In this crown the metal part is all soldered together with pure gold, making it very strong and wholly independent of the porcelain for its strength.

Dr. Chas. E. Post, San Francisco, read a paper entitled "Choice of Materials for Crowns."

Dr. Post started with this postulate: "A crown, to be a success on any of the teeth anterior to the molars, must be strong and well matched as to color and size, and must be firmly fixed." He does not believe in all-gold crowns, on the bicuspids or any of the anterior teeth, except in rare cases, as where the pulp cannot be destroyed or the buccal or labial face ground away sufficiently without exposing the pulp, to allow a porcelain front. He thinks the contrary practice little short of malpractice, especially in the mouth of a lady. If we are to be mere mechanics, and not artists, then there is an excuse for all-gold crowns in the anterior teeth, but if we are to be artists as well as mechanics, it behooves us to imitate nature as closely as possible.

With a good, strong root, the Logan crown, accurately fitted, is very serviceable and artistic. The principal objection is that the dealers do not carry sufficient stocks of them to give the proper variety in size and color to choose from, and if one that will not cover the end of the root is not to be had, some means must be found to entirely protect the root from decay. He prefers a crown with band and cap, because they seem to be stronger and more firmly fixed, preserve the root, and prevent its splitting, giving the preference to Stowell's method described in Evans's "Artificial Crown- and Bridge-Work." He considers the Downie the best crown, or one made by baking on a porcelain back, and the Downie furnace seems to be the best and most convenient yet introduced.

The paper then quoted Dr. Downie's method of making crowns, the main advantages of which are that they are cleaner, as the joint between facing and band is perfectly tight; stronger, as the backing is fused to the facing, and all the strain does not come on the pins; and easier to make and finish.

As to the objection that bands irritate the gums and peridental membrane, Dr. Post quoted Dr. Evans at some length on the point, in the light of whose opinion he considered it safe to use bands, provided always the band is tight-fitting.

(To be continued.)

WOMAN'S DENTAL ASSOCIATION OF THE UNITED STATES.

THE regular monthly meeting of the Woman's Dental Association of the United States was held October 6, 1894, at the office of Dr. Focht, in the Bank Building at Broad and Columbia avenue, Philadelphia; the president, Dr. Anna T. Focht, in the chair.

Subject of the evening, "The Care of Patients," by Dr. Anna Felton Reynolds, of Boston. In the absence of the essayist, the paper was read by Dr. Mary H. Stilwell.

The next meeting will be held at Dr. Maria T. Lasser's office, 1602 Arch street, November 3, 1894.

EMILY W. WYETH, *Rec. Sec.*,
3920 Fairmount ave., Philadelphia.

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DENTAL SOCIETY ANNOUNCEMENTS.

THE HORACE WELLS ANNIVERSARY CELEBRATION.

[THE following announcement is published by request of the committee, in order that it may be brought to the notice of a larger number of the profession than could be conveniently reached by means of individual communications. The invitation is intended for all reputable practitioners who are interested in the matter.—Editor DENTAL COSMOS.]

Dear Doctor:

You are doubtless aware of the action of the American Dental Association, at its recent meeting held at Old Point Comfort, Va., with reference to holding a national celebration of the Fiftieth Anniversary of the Discovery of the Anesthetic Properties of Nitrous Oxid, by Dr. Horace Wells.

The committee, by vote of the American Dental Association, was instructed to secure two papers to be read at the celebration: one upon the "History of Anesthesia," by Prof. Thomas Fillebrown, of Boston; and one on the "Benefits of Anesthesia to Mankind," by Prof. James E. Garretson, of Philadelphia.

The committee was further instructed to arrange for a banquet to follow the meeting, at which distinguished speakers shall make appropriate addresses. A full report of the celebration, including the papers and addresses, to be printed and issued as a permanent souvenir of the occasion.

Arrangements have been completed to the extent of securing favorable responses from the essayists named, whose papers are now in course of preparation.

The banquet arrangements are also largely completed. To cover the expenses attending the celebration, the fee for admission to the banquet has been placed at $6.00. It is necessary that the committee shall have ample notice of the number who will be in attendance, in order that places may be provided for all who may desire to attend.

Subscriptions will be invited later for the souvenir volume, at a price sufficient to cover the cost of publication.

The celebration will be held in Philadelphia, on Tuesday, December 11, 1894.

You are cordially invited to participate in this event, which should enlist the enthusiastic support of every member of our profession.

To that end you are requested to send your check and notify the chairman of the Anesthesia Committee, at the earliest date possible, in order that an official invitation may be sent to you.

It will be proposed at the meeting that subscriptions be invited for a permanent memorial, to take such shape as the meeting shall decide.

(Signed)

LOUIS JACK,	S. H. GUILFORD,
E. T. DARBY,	WM. CARR,
C. N. PEIRCE,	A. L. NORTHROP,
D. N. MCQUILLEN,	H. B. NOBLE,
E. C. KIRK,	JAS. MCMANUS.

J. D. THOMAS, *Chairman*,
912 Walnut St., Philadelphia.

OFFICERS AND COMMITTEES OF PENNSYLVANIA STATE DENTAL SOCIETY, 1894 AND 1895.

J. A. Libbey, president, Pittsburg; E. C. Kirk, first vice-president, Philadelphia; H. N. Young, second vice-president, Wilkes-Barre; C V. Kratzer, recording secretary, Reading; H. E. Roberts, corresponding secretary, Philadelphia; G. W. Klump, treasurer, Williamsport.

Board of Dental Examiners.—W. E. Magill, Erie, president; J. C. Green, West Chester, secretary; Louis Jack, Philadelphia; L. Ashley Faught, Philadelphia; C. S. Beck, Wilkes-Barre; G. W. Klump, Williamsport.

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Committee on Legislative Action.—E. C. Kirk, Louis Jack, Philadelphia; E. P. Kremer, Lebanon; Henry Gerhart, Lewisburg; W. E. Van Orsdell, Sharon; W. H. Fundenburg, Pittsburg.

Committee on Enforcement of Dental Law.—J. S. Goshorn, Pittsburg; J. B. Keifer, Altoona; W. H. Fundenburg, Pittsburg; Alonzo Boice, Philadelphia; G. W. Warren, Philadelphia.

Clinical Committee.—P. K. Filbert, Pottsville; R. B. Cummins, Blairsville; D. N. McQuillen, Philadelphia.

Reception Committee.—G. W. Green, Newcastle; H. N. Young, Wilkes-Barre; F. A. Coney, Doylestown.

Exhibit Committee.—A. B. Abell, Philadelphia; W. A. Kessler, Pittsburg; F. A. Coney, Doylestown.

Committee on Revision of Constitution and By-Laws.—E. T. Darby, Philadelphia; Robert Huey, Philadelphia; Louis Jack, Philadelphia.

The next annual meeting will be held at Eagle's Mere, Pa., July 9, 1895.

HOWARD E. ROBERTS, *Corresponding Secretary*,
1321 Walnut Street, Philadelphia.

OHIO STATE DENTAL SOCIETY.

THE Ohio State Dental Society will hold its next annual session at Neil House, Columbus, Ohio, December 4, 5, 6, 1894.

J. R. CALLAHAN, *Chairman Executive Committee.*

EDITORIAL.

THE DISCOVERY OF THE ANESTHETIC PROPERTY OF NITROUS OXID.

THE announcement of the proposed celebration, by the dental profession of America, of the fiftieth anniversary of the discovery of anesthesia by Dr. Horace Wells appears to have aroused a mild protest on the part of some of our English *confrères*, who hold that first honors are due to Sir Humphry Davy for his previous discovery of the same property of the gas. An able article by Sir Benjamin Ward Richardson, reprinted from *Longmans' Magazine* in the "Quarterly Circular" of C. Ash & Sons, September issue, has the following foot-note appended:

"The members of the dental profession in America are preparing to celebrate 'the fiftieth anniversary of the discovery of the anesthetic property of nitrous-oxid gas by Horace Wells, of Hartford, Conn.,' on the 11th of December, this year, but Sir Benjamin W. Richardson proves, in this paper, that 'by every rule of justice and of truth Sir Humphry Davy deserves the credit of the discovery,' and that Horace Wells is entitled to the credit of the *practical application* of the discovery, 'by a test operation performed on himself.'

"Sir Benjamin W. Richardson's statements are confirmed by the following brief quotations from well-known American works:

"*Harris's Dictionary of Dentistry.*—'Sir Humphry Davy, in 1799, first discovered its anesthetic property upon inhalation, and, in 1844, Dr. Horace Wells, of Connecticut, applied it to dental purposes.'

> "DENTAL COSMOS, *June, 1860, p. 594.*—'With regard to *priority in suggesting the use of nitrous oxid* in surgical operations, the *credit* undoubtedly belongs to Sir Humphry Davy,' and . . . . 'the credit of first making a *practical application* of this suggestion unquestionably belongs to Horace Wells.'
>
> "DENTAL COSMOS, *May, 1864, p. 597.*—'There appears to be no reason to doubt that Sir Humphry Davy was the first to observe the property of nitrous-oxyd gas of producing insensibility. A note dated either in 1799 or in 1818, and contained in his "Researches on Nitrous-Oxyd Gas," suggests its trial in surgical operations, inasmuch as it appeared capable of destroying physical pain, Sir H. having himself used it to relieve violent attacks of toothache. The experiments of Thénard agree with those of Davy ; it was, however, an American dentist, Horace Wells, who applied it practically.'—(*American Druggists' Circular.*)—C. A. & S."

An editorial in the October issue of the *Journal of the British Dental Association* quotes from Dr. Hewitt's work on anesthetics the following statement :

> "Its properties were only investigated by Sir Humphry Davy, in 1799–1800, who recognized its power of alleviating pain, and suggested that it might be used as an anesthetic for surgical operations. . . ."

The editorial then continues as follows :

> "Any one who is interested in the subject will find in 'The Collected Works' of Sir Humphry Davy an account of this great philosopher's experiments upon himself, and a statement which has over and over again been quoted to show that he was perfectly familiar with the power possessed by the gas of annihilating pain. In short, we may say that nitrous oxide was first prepared by Priestley ; its anesthetic properties were discovered by Davy ; and it was first employed in surgical practice by Wells."

So far as we are aware, there is no intention, nor has there been any, on the part of American dentists, to overlook or belittle the importance of the published discovery of Sir Humphry Davy. The historical record upon this point is unequivocal, and clearly sets forth the fact that Sir Humphry Davy, by practical test in his own person, discovered the anesthetic property of nitrous oxid, and furthermore that he suggested its use in surgery because of its power to induce insensibility to pain. The following quotation from his writings will dispel any doubts upon this phase of the matter :

> "The power of the immediate operation of the gas in removing intense physical pain, I had a very good opportunity of ascertaining.
>
> "In cutting one of the unlucky teeth called dentes sapientiæ, I experienced an extensive inflammation of the gum, accompanied with great pain, which equally destroyed the power of repose and of consistent action.
>
> "On the day when the inflammation was most troublesome, I breathed three large doses of nitrous oxide. The pain always diminished after the first four or five inspirations ; the thrilling came on as usual, and uneasiness was for a few minutes swallowed up in pleasure."—*Page* 276.

"As nitrous oxide in its extensive operation appears capable of destroying physical pain, it may probably be used with advantage during surgical operations in which no great effusion of blood takes place."—*Page* 329.*

It is to be noted that this published statement by Sir Humphry Davy, though an open matter, was consigned to the oblivion of public indifference for a period of forty-five years, and was practically lost to sight until the announcement of the discovery made by Horace Wells, of Hartford, Conn., U. S. A. The limitless possibilities of this discovery set the world by the ears, and some of our English brethren to rummaging through historical junk-shops to rehabilitate the claims of their countryman to honors which they failed to accord him until the American dentist had materialized them. Horace Wells made the experiment and announced the result, either with or without previous knowledge of Sir Humphry Davy's experiment. If he had knowledge of Davy's observations, his so-called discovery becomes simply a practical application of facts already established. The whole history of his relation to the matter—not only the published record, but the testimony of witnesses still living, who were present when he made the personal experiment—gives the clearest possible evidence as to the originality of his discovery ; nor, so far as can be ascertained, has its originality with Horace Wells ever been questioned. Therefore to simply assert that "Horace Wells is entitled to the credit of the practical application of the discovery" is to state but half the truth, for he discovered the anesthetic property of nitrous oxid within exactly the same meaning as did Sir Humphry Davy. The discovery, as a discovery, was original with Horace Wells as truly as it would have been had Sir Humphry Davy never existed. So far as we can rely on the evidence furnished by the records of history, it is a case of independent discovery exactly analogous to the discovery of oxygen by Dr. Priestley and by Scheele, albeit a longer interval elapsed between the two observations in the former case. The question of priority in the nitrous-oxid discovery is definitely settled in favor of Sir Humphry Davy, and is fully recognized in the literature of the subject. The historical portion of the article on anesthetics in the "American System of Dentistry" sets forth the facts with clearness and accuracy. Any candid person must admit the duality of the discovery ; but when it comes to giving to each investigator his fair share of honor, it must be remembered that it was through the discovery of Horace Wells that the direct benefits to humanity were achieved, and not by the discovery announced by Sir Humphry Davy. When the importance of the discovery of Davy was permitted to remain unnoticed by his own countrymen through a period of nearly half a century, it can hardly be expected that they should fully appreciate the merits of the same discovery when made and announced in its completeness by a foreigner.

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* "Researches, Chemical and Philosophical, Chiefly Concerning Nitrous Oxide, or Dephlogisticated Nitrous Air, and its Respiration." By Sir Humphry Davy, Bart. London : Smith, Elder & Co., Cornhill, 1839.

BIBLIOGRAPHICAL.

The Anatomy and Pathology of the Teeth. By C. F. W. Bödecker, D.D.S., M.D.S. Octavo, 688 pages; 325 illustrations. Philadelphia: The S. S. White Dental Manufacturing Co., 1894. Price, cloth, $5.00; sheep, $6.00.

After one has read the forty-eight chapters in this book, he can truthfully say that it is a publication without which no dental library can be complete. It is a book with which every one, whether teacher or student, who desires to be conversant with the subjects of which it treats, should be familiar.

In its eighteen chapters on dental anatomy, tooth-development, and allied subjects, the general and special anatomy of the teeth are so fully discussed that little has been omitted which it would be profitable to read, and conversely little is contained therein which it would not, for the student especially, be desirable to know.

The history of tooth-development, so difficult for the student to comprehend, is as thoroughly portrayed as the limitations of such a work would permit, and though only a synopsis of the subject is promised in Chapter XIII, we think the author has been especially happy in both illustration and text.

The time, care, and space occupied in preparing the measurements of the pulp-chamber and distances of the pulp-horns from the cutting-edges or the cusps of the molars, we think might have been more profitably spent, for the variability of these cavities and canals is such that measurements can be of little value; and when it is stated that they vary in size with the age and temperamental peculiarities of the individual, all that is reliable has been said.

The two tissues through which the teeth hold their connection with the arterial and nervous system—dental pulp and pericementum—are each given a valuable chapter. The chapter on "Absorption of Roots of Temporary Teeth" is rather disappointing, and the comparison made by noting the similarity in absorption of portions of dead bone and ivory with this *physiological* process will be rather misleading to the student, as in the former case a pathological process accomplishes the removal, partial or complete.

The chapter on the physiology of the hard dental tissues is short, and though it encroaches somewhat upon debatable ground, it is extremely interesting and instructive.

The chapters on secondary dentine, mechanical abrasion, and erosion, are greatly enhanced in interest by being so thoroughly illustrated. Regarding the latter (erosion), the reader will look in vain for some description of the labial glands, their physiology, etc., and just *what acid*, if any, it would be possible for them in a hyperæmic or disordered condition to secrete. This information would have been extremely pertinent, as the disastrous effects of erosion are largely attributable to these glands. Did space allow, much praise and some little criticism could be utilized in introducing to the reader of this the chapters on hyperostosis, inflammation, ulitis, eburnitis, pericementitis, and pulpitis, all of which have their interest increased by appropriate illustrations.

The difference between "partial acute pulpitis" and "total acute pulpitis," as set forth by the author, has certainly never been better portrayed, and, though to the student it may at first be a little confusing, careful reading will render it clear. The same may be said of non-purulent and purulent pulpitis.

Under the title "Pericementitis in Its Clinical Aspect" are grouped a number of morbid conditions, including the one termed pyorrhea alveolaris. The author has wisely and effectually differentiated these, and candidly given the views of others, as well as his own, though decidedly dissenting therefrom ; but when he admits that calculi are found on the roots of teeth where the gingival borders are intact, and that many cases of pyorrhea alveolaris can be attributed to nothing but hereditary predisposition, he opens the door wide enough to admit the theories of those with whom he professes to differ, even though they should hold that a certain form of pericementitis is closely allied to the gouty diathesis. The author states that "pyorrhea alveolaris *might be* confounded with a deposition of salivary calculi, which in some instances give rise to symptoms similar to those of true pyorrhea alveolaris." The writer would add not only *might be*, which we have italicized, *but is*. And this form of pyorrhea, as the author states, yields readily to local treatment, and does not return so long as the necks of the teeth are kept free from calculary deposits.

Chapter XL, upon caries of the teeth, is certainly creditable work. The writer has met with nothing on this subject from which the student could get a more intelligent description of this pathological process than by a careful reading and re-reading of this chapter. In this, as in those previously noticed, the beautiful illustrations add greatly to the interest of the text.

The concluding chapters on the effects of arsenic on tooth-pulp, necrosis of jaw-bones, disease of antrum, clinical features of tumors, malformations and malpositions of the teeth, bring the reader to the end of a work remarkably clear and comprehensive, and in some subjects even radically minute. Notwithstanding that the reader will occasionally feel that the author is treading on debatable ground, yet he cannot but be impressed with the fact that the work is a notable contribution to the literature of our profession, a book of real merit and worthy of careful study.

The publishers may well feel satisfied with their part, for in its manufacture they have given us a book with clear type, pleasant margins, illustrations well arranged, with binding neat and durable.

The book deserves success, and it will undoubtedly meet with that recognition from the profession which it so well deserves.

C. N. PEIRCE.

MANUAL OF OPERATIVE TECHNICS. A Practical Treatise on the Elements of Operative Dentistry. By THOMAS E. WEEKS, D.D.S., Professor of Operative Dentistry and Dental Anatomy in the College of Dentistry, Department of Medicine, University of Minnesota. Chicago: H. D. Justi & Son, 1894. Price, cloth, $2.00.

It is with peculiar pleasure that we commend this book to the consideration of the dental profession. Its publication marks an epoch in dental educational methods which should command the attention of all teachers and students of dentistry.

In 1888, Dr. G. V. Black, in a paper before the Chicago Odontological Society, called attention to the importance of systematic laboratory instruction in operative procedures to prepare the untrained student for work in the clinic room, and gradually developed such a system in his own teaching work.

The ideas set forth were accepted and tried by other teachers, and when measured by the results achieved were found to be a distinct improvement upon the stereotyped methods of dental instruction previously in vogue. It was, in fact, an adaptation of the manual-training method to dental instruction. By this method knowledge is acquired at first hand by the student through sense-impressions received directly from the objects and phenomena with which he has to deal, and not second hand through an association of ideas conveyed orally by the teacher.

Professor Weeks's Manual of Technics embodies a course of training for the new student, systematically arranged and covering a large territory, with which the student should be thoroughly familiar, both theoretically and practically, before he is allowed to operate upon a patient. Such a course, conscientiously gone through with, will not only give him a clear understanding of what he is to do, but will so train him manually that he can do it successfully.

The book is a pioneer in its field, and will no doubt be modified in some of its details as time and experience in the use of the system warrant its further development.

A detailed examination of the work reveals few if any points for criticism. On page 78, the author is in doubt as to whether tin forms a crystalline compound with mercury, and cites two writers of contrary opinion, thus leaving the question open. Tin does form such a compound, and if any doubt existed in the author's mind the question should have been settled by experiment. Future editions will, we hope, be free from this element of uncertainty. The book has received the indorsement of the National Association of College Faculties.

A MANUAL OF DENTAL ANATOMY, HUMAN AND COMPARATIVE. By CHARLES TOMES, M.A., F.R.S. Fourth edition, with 235 illustrations. Pp. 559, 12mo. Philadelphia: P. Blakiston, Son & Co., 1894. Price, $4.00.

We have here an instance of a title which describes, for this work is a manual, not an exhaustive treatise. As in previous editions, the book is a model of its kind, and it is a good kind.

Its position in dental literature is that of a classic, and the reputation is well deserved, for to all who have any degree of interest in the subject of dental anatomy, human or comparative, this is the indispensable work upon odontography. It is an eminently safe book for students, under-graduate or post-graduate, for the author rarely commits himself in any controverted matter, but presents clearly all sides of disputed subjects. This enhances the value and insures permanence to the work.

It treats only of the dental anatomy of the vertebrata; this may or may not be a matter of regret to the reader.

The sections upon dental histology and embryology are comprehensive, and as complete as any one but a special inquirer could desire.

The origin and structure of Nasmyth's membrane is treated as an open question; the author presents all the representative views which have been taken.

The part relating to the development of the jaws might be improved by added and judicious illustration.

The literature pertaining to dental histology and embryology has furnished during the past decade a wealth of illustrative material, which the author would have been wise to use in the further elucidation of his text, though as it is the volume is profusely illustrated. The suggestion is advanced merely as a possibility of adding in some degree to the value of a work which is justly appreciated when it is termed unexcelled.

SYLLABUS OF LECTURES ON HUMAN EMBRYOLOGY. An Introduction to the Study of Obstetrics and Gynæcology. For Medical Students and Practitioners. With a Glossary of Embryological Terms. By WALTER PORTER MANTON, M.D., Professor of Clinical Gynæcology and Lecturer on Obstetrics in the Detroit College of Medicine; Fellow of the Royal Microscopical Society, of the British Zoological Society, American Microscopical Society, etc. Illustrated with seventy outline drawings and photo-engravings. 12mo, cloth, 126 pages, interleaved for adding notes and other illustrations. Philadelphia: The F. A. Davis Co. Price, $1.25, net.

This book is a clear, concise, and practical guide to the study of embryology. While free from useless verbiage and giving the subject in a greatly condensed form, it is still remarkably lucid in its treatment. It is essentially a student's book, one of those useful manuals which is a valuable aid in laboratory work. Appended to the main work is a section upon the technique of making sections for embryological study, giving the entire subject in detail. We know of no better work on the same subject.

PAMPHLETS RECEIVED.

The Effect of Exercise upon the Teeth. By A. Hugh Hipple, L.D.S., D.D.S., Omaha, Nebraska. Reprinted from the *New York Medical Journal*, June 16, 1894.

Artificial Dentistry among the Etruscans. By Charles W. Dunn, Florence, Italy.

Practical Sewage Purification. By Henry Leffmann, A.M., M.D. Reprinted from *The Dietetic and Hygienic Gazette*, May, 1894.

OBITUARY.

DR. N. B. GREGORY.

DIED, at Unadilla, N. Y., September 23, 1894, of heart-failure, Dr. NELSON B. GREGORY, in the fifty-sixth year of his age.

Dr. Gregory was born at Unadilla Center, Otsego county, N. Y., November 16, 1838. He was educated at Norwich Academy. He studied dentistry with his brother-in-law, Dr. C. G. Sumner, of Norwich, afterward becoming his preceptor's partner. While still young, however, he made up his mind to broaden his knowledge, and traveled and practiced in many sections of America, until 1861, when he sailed for Europe, and soon after his arrival entered the office of Dr. Coffin, in Manchester, England, where he continued in practice until about 1863, when he went to Paris and became associated with Dr. Stevens, an English dentist of large practice there. Upon the death of Dr. Stevens, about a year later, Dr. Gregory conducted the practice for the estate, and laid the foundation for a marked financial success. In 1872 he removed to Lyons, and opened an office and conducted a successful practice, being one of the first American dentists to locate there. This continued for some ten years.

During his career abroad, Dr. Gregory frequently revisited America, but it was not until about 1882 that he retired from active practice and returned to this country, devoting his remaining years to breeding blooded stock on his "Island Farm" at Unadilla. He was a man of commanding figure, charitable and generous to a fault, and socially popular. He was a member of the Masonic fraternity, and also an honorary member of the Sixth District Dental Society of the State of New York. His funeral was largely attended.

DR. ROBERT B. BAYNES.

Died, at Buzzard Park, Florida, September 30, 1894, of hemorrhage, Dr. Robert B. Baynes, in the one hundredth year of his age.

Dr. Baynes was probably the oldest dentist in America, and had he lived a little less than a year longer he would have been a centenarian. He was born in London, England, of wealthy parents, who met with financial reverses, and he was obliged to seek his own living. He learned the watchmaker's trade, which he followed in England for some years, until he came to America, and worked for a time at it in New York. He then went to Boston and studied dentistry, subsequently locating in Rockland, Maine, where he opened an office for a practice extending over a very long time,—up to within a recent period. He was considered an expert dentist.

Dr. Baynes had some peculiarities, among which were that he had been a vegetarian for over half a century, and had lived almost entirely alone. He claimed to have mesmeric powers, which he sometimes put in practice. A few years ago a married niece, about his only relative, prevailed upon him to return with her to her southern home in Florida to spend the remainder of his days, but he died a short time after reaching there. He was a Free Mason.

DR. JOSEPH W. SCHWACKE.

Died, at Sullivan's Island, July 1, 1894, Joseph W. Schwacke, D.D.S., in the twenty-ninth year of his age.

Dr. Schwacke was born in the city of Charleston, S. C., May 2, 1866. After finishing his education in the public schools of his native city, at the age of fourteen he was sent to Germany to acquire a thorough knowledge of the German language, as well as to increase his business knowledge. After a stay of three and a half years in the city of Dresden, he returned home and accepted a position in a large cotton and brokerage business. Until 1889 his life was spent as an employee of several business houses, when he decided to study dentistry. In the fall of 1889 he matriculated in the Dental Department of the University of Pennsylvania, and graduated with the class of 1891. Since that time he had practiced in his native city until his death, and enjoyed a lucrative and growing patronage. His sad and untimely death has caused much sorrow among his relatives and numerous friends. While bathing in the surf on Sullivan's Island he was carried out and drowned in sight of friends before aid could be obtained, and his body carried out to sea.

DR. JOHN W. HOLT.

Died, at Goldsboro, N. C., October 9, 1894, of stomach and bowel trouble, John W. Holt, D.D.S., in the fifty-second year of his age.

Dr. Holt was born near Smithfield, Johnson county, North Carolina, in 1843. He was a soldier in the Confederate army during the Rebellion. He first studied medicine, but subsequently matriculated at the Baltimore College of Dental Surgery, from which he graduated in 1874. He then entered practice at Goldsboro, and his professional success was marked and remunerative to a large degree.

Dr. Holt was a member of the North Carolina State Dental Society, and took an active interest in professional and educational matters. In the community he was widely esteemed; was faithful in every trust; kind, compassionate, and true. He was never married, and leaves of surviving relatives only one brother and one sister, the death of another sister having occurred three days subsequent to his own. His funeral was largely attended.

DR. F. M. OSBORN.

Died, at Bradford, N. H., August 30, 1894, of heart-failure, Dr. Francis Martindale Osborn, in the fifty-fifth year of his age.

Dr. Osborn was born at Patchogue, Long Island, N. Y., September 2, 1840. He commenced the study of dentistry in 1858, with Drs. Brigham and Monroe, and entered upon practice in Fulton street, Brooklyn, in 1860. He subsequently went to Port Chester, N. Y., and was in active practice there for many years.

Dr. Osborn was a member of the Dental Protective Association, in which he took a special interest. He was married in 1863 to Miss Ella A. White, of Dover, N. Y., and his wife and two daughters survive him. His death was largely due to close confinement to work.

DR. H. N. MOORE.

Dr. H. N. Moore, of Morris, N. Y., was accidentally killed while hunting, October 20, 1894. His age was thirty-one years. Dr. Moore graduated from the Boston Dental College in 1885, standing high in his class. He was universally well liked, both as a dentist and a man. He leaves a wife and two children.

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HINTS, QUERIES, AND COMMENTS.

A Simple Method of Casting Solid Gold Cusps.—Place a small piece of moldine—it is better if a little dry and stiff—on your soldering block; give it a flat surface, and coat with soapstone. Into this press the cusps of a porcelain tooth, or any cusp suitable for the case in hand. Place gold scraps on the die thus made. Fuse by means of the blow-pipe, and while the gold is in a molten state, press it into the die with a flat-end carbon stick.

This will give a perfect gold cusp, occupying only a few minutes' time, and enabling one to utilize gold scraps, filings, etc. Another advantage is that it permits one to select from an almost endless variety of cusps, either those of natural teeth, porcelain teeth, or any dies that one may have on hand.

This method is not entirely original. The same mode of procedure is advocated by the "Hollingsworth System," except that asbestos is used instead of moldine. Some use marble-dust and plaster.

I have never heard of moldine being used for this purpose, and I find it by far the easiest and most convenient material to use; taking less time and giving more perfect results. I use the same method for making dummies. I select a rubber tooth to suit the case, imbed in moldine, and proceed as described for cusps.—L. C. ELKINS, Sanford, Florida.

A NOVEL DENTAL OPERATION.—In the August COSMOS, under the head of "Hints, Queries, and Comments," Dr. W. H. Baldwin calls attention to the work of gold-crowning deciduous teeth.

My practice in this dates back to February 8, 1893, when the superior central incisors of my son, then four years old, were crowned. This practice has been followed by me ever since, including four crowns for an infant daughter in November, 1893, she then being twenty-three months old.

While attending the Illinois State Dental Association in May last, by invitation of the chairman of the clinical committee my children were presented and their crowns commended by members, and the belief expressed that this was the first of its kind on record.

This method of treating deciduous teeth must prove of vast advantage in relief from pain and in durability.—W. W. SHRYOCK, D.D.S., Fort Wayne, Indiana.

TO THE EDITOR OF THE DENTAL COSMOS:

Sir,—I have just discovered that sulfur may not be used as a cement with the *bright-metal* How screw-posts; the heated sulfur attacks the silver of the post to such an extent as to leave only half or a third of the post in good condition.

The *crown* metal posts seem not to be injured by the sulfur.

The posts are often useful for attaching "tube teeth" to the caps when making a banded bicuspid crown, using the post for the pin to enter the canal, and allowing it to pass through and stand high enough to almost reach the grinding-surface of the completed crown.

The "A" post just fits the tube, or by drilling out the platinum tube the hole is left just right for the "B" post. When the tooth is cemented on with sulfur, and a little gold filling dovetailed around the pin end, the resulting crown is a very clean one without a crevice of any kind. It has the further advantage that the porcelain has not been exposed to the heat of soldering. If the crown be a long one, so that the pin may be safely shortened enough to allow it, a piece of porcelain of the right shade set over the end of the pin makes a still neater appearing piece of work.

May I add a word about the comparatively new crystal golds? Are we being careful enough in their use? Only a few days ago I saw a case from the hands of a young operator, who gives evidence of being competent by doing good regulating work. Fillings in the same mouth made but a year ago have failed completely. When they remain in place I find upon picking off the condensed surfaces that the rest of the filling is one of the "plastic" golds, still retaining its characteristic brownish color. In most of them I am readily able to push a slender exploring point through this gold, in any direction, to the bottom of the cavity.

I fear we are sometimes deceived by the ease with which these golds seem to pack, and that our seemingly well-condensed blocks are solid on the surface only.—Henry W. Gillett, D.M.D.

[Dr. Gillett's observation with respect to the action of sulfur upon the bright-metal screw-posts is fully in accordance with the nature of the materials concerned.

In the advertisement of these appliances it was stated with reference to "Bright-Metal Posts" that they are "made of an alloy of silver and platinum; the silver in the alloy will of course render it subject to some discoloration when exposed to the action of the sulfurets."

To any one familiar with this alloy, and with the chemical relationships of its constituent metals, the experience of Dr. Gillett would be a foregone conclusion.

The most suitable crown-post for use with sulfur as a cement would be one made of platinized gold or, better still, of iridio-platinum.—Editor Dental Cosmos.]

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A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a Thesis.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING SEPTEMBER, 1894.

September 4.—No. 525,519, to Joseph Spyer. Method of making dental plates.
" *11.*—No. 525,797, to George B. Richmond. Dental pellet.
" " No. 525,798, to George B. Richmond. Dental pellet machine.
" " No. 525,816, to Francis M. Osborn. Dental apparatus.
" " No. 525,920, to Augusto A. Nouel, Jr. Dental plugger.
" *18.*—No. 526,020, to Arthur W. Browne. Adjustable bracket.
" " No. 526,071, to Emery B. Cushing. Dental chair.
" " No. 526,332, to George W. Traphagen. Method of forming dental plates.
" *25.*—No. 526,452, to C. C. Lusby and C. H. Richardson. Syringe.
" " No. 526,462, to Zachary T. Sailer. Dental tool sterilizing apparatus.

THE

DENTAL COSMOS.

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ORIGINAL COMMUNICATIONS.

SULFURIC ACID FOR OPENING ROOT-CANALS.

Second Paper.

BY J. R. CALLAHAN, D.D.S., CINCINNATI, OHIO.

(Read before the New Jersey State Dental Society, July 18, 1894.)

FOR the purposes of this paper, let us agree that dead pulp-tissue should be removed from all devitalized teeth, and that the chambers and canals should be subjected to the most thorough surgical treatment for the preservation of the teeth and the surrounding tissues. When we say thorough surgical treatment, we mean that the whole operation should be conducted upon a thoroughly aseptic basis, from the beginning to the end of the operation, for asepsis is the foundation essential for all successful surgery, be it minor or major. To open root-canals by means of drills and broaches has been the accepted method; how nearly perfect this method has been, each one must answer for himself. Every thoughtful dentist will admit that in the use of drills and broaches, as generally used, asepsis is lost sight of; the septic matter being frequently forced through the foramen, inflammation and suppuration following in many cases. In large and straight canals you get fairly good results by the accepted method. But the more profound is the respect the dentist has for truth, the less he has to say about the successful opening and treatment, by the usual methods, of canals in the buccal roots of superior molars and anterior roots of inferior molars.

To make the purpose of this paper clear, let us suppose we have an inferior molar in which the pulp has been destroyed; we adjust the rubber-dam, open the pulp-chamber thoroughly, take an old discarded broach, twist a little cotton on the end, bend the broach to a right angle, so that it will reach well down into the cavity; place the broach in a suitable handle, and by means of broach and cotton place directly upon and about the dead pulp a drop or two of a forty or fifty per cent. aqueous solution of sulfuric acid. The solution, by a process of dehydration, will cause the pulp to shrink and toughen, so that it can with comparative ease be removed. Now by means of broach and cotton place a drop of the solution over the entrance of each canal; sometimes it will be necessary to sink a little well or depression at the mouth of the canal to get the acid to stay where it is wanted, being careful to use only round or bud drills for this purpose. Take a No. 5 Donaldson nerve-canal cleanser, bend it to a suitable angle, cut the shank short with nippers, so that the broach will fit up close to the handle and be rigid and strong; then with a pumping motion begin to enter the canal slowly and carefully. The acid will precede and follow closely the fine broach, and destroy all septic matter with which it comes in contact. Proceed till the patient notifies you of a sensation which is similar to that felt when chloro-percha goes through the foramen. Treat all of the canals in the same manner; I say all, because sometimes you will find what appear to be four distinct canals. Usually three canals will be found; the posterior root will have one broad canal, the anterior root will nearly always show what seem to be two canals. By this time the solution will be so charged with disintegrated tooth- and pulp-substance that it will hide the canals from view. Now by means of a Dunn syringe fill the cavity with a saturated solution of bicarbonate of soda; this when brought in contact with the acid solution liberates carbonic acid gas in such quantities that the effervescence will carry all the broken-up tooth- and pulp-substance out of the canal, out of the tooth onto the rubber-dam, leaving a deposit of bicarbonate of soda, lining the whole tooth. This deposit can be removed, if so desired, by a little sterilized water, alcohol, or peroxid, either of which will leave the canals white and clean. If necessary to make the canals larger, place more acid in them and use a larger broach, till the canal is as large as wanted; then cleanse again with bicarbonate of soda, dry the canals thoroughly by means of paper points, alcohol, hot air, etc., and you have the cavity and all the canals thoroughly opened, thoroughly clean, thoroughly aseptic, so that you can proceed to treat or fill as you may choose. I usually fill the roots at once, but if there be signs of inflammation, I treat according to symptoms.

There are numerous cases where experience has shown this treatment to be of great value. I will relate briefly the case of Miss A., who had called on her regular dentist for relief; she was annoyed by a soreness about the roots of the right inferior second molar. The dentist, a very skillful man, tried in every way he knew to give her relief, but with all his skill and perseverance he failed to get the apical foramen open, so that the pus might escape from the apical space. Cutting through the gum and bone to the apex of the root was suggested, but the tooth had grown so sore by this time that the lady lost courage and refused to submit to the operation. Upon the advice of a neighbor, she called at my office. By the use of the acid and broach the pus was escaping through the root-canals in a very few minutes, and the roots were filled at the second sitting. Some of you no doubt are ready to declare such treatment will ruin the tooth and damage the surrounding tissues; to which I answer, nearly five years' use in my own hands and one to three years' use in the hands of several of my professional friends has produced results far more satisfactory to ourselves and our patients than we are able to obtain by the usual methods.

Allow me to give in a condensed manner a few reasons for my faith in this seemingly heroic treatment.

First, the action of sulfuric acid on dentine is self-limiting, at least so nearly so as to make the operation perfectly safe.

Second, H_2SO_4 is a pronounced germicide.

Third, it has been shown that sulfuric acid acts with far greater vigor upon diseased tissue than upon healthy tissue.

Fourth, the acid breaks down or destroys the diseased tissue, leaving a fresh aseptic surface that nature will take care of with but little assistance ; this condition obtains in the abscess and fistulous tract, as well as in the root.

Fifth, an aseptic wound will heal itself in any part of the body, if properly closed.

Sixth, the solution softens the dentine for an indefinitely short distance ; the broach removes this softened dentine, the acid instantly attacks the fresh surface, the instrument again cutting the softened surface, and so on, as long as the tooth is exposed to the action of the instrument and the acid.

Seventh, the bicarbonate-of-soda solution neutralizes the acid, and at the same time generates carbonic acid gas in sufficient quantities to carry the *débris* from the canals.

I have tried to avoid making Munchausen-like statements as to the infallibility of this method in each and every inaccessible and spiral-like root-canal, but I will promise those who carefully and intelligently undertake this work an agreeable surprise. You will be surprised at the ease, the brevity, the thoroughness, and the permanent success attending the intelligent use of this method.

MANAGEMENT OF PULPLESS TEETH.

BY C. N. JOHNSON, L.D.S., D.D.S., CHICAGO, ILL.

(Read before the New Jersey State Dental Society, July 19, 1894.)

An apology might seem in order for presenting a paper before such a society as this upon a subject that has been so much discussed, were it not for the fact that we see in practice so many failures resulting from improper methods in this line of work. In no department of our practice is the saying more true than in this, that "whatever is worth doing at all is worth doing well." Assuredly if a pulpless tooth is worthy of any treatment, it is worthy of the most skillful and scientific treatment.

The plan of the present paper is to detail, in as systematic order as may be, a single method for managing each of the different classes of pulpless teeth as we encounter them in practice. The reason this particular method has been selected for presentation is not so much on the ground of originality as from the fact that it has proved in the hands of the essayist the most simple and effective in his experience.

DESTROYING PULPS.

To confine the paper strictly to the title, the subject of pulp-destruction should not be broached, but with the indulgence of the society the writer wishes briefly to outline a method which seems to him, after four years' experience with it, to be worthy of some consideration. Arsenic in the ordinary form is not any longer used as an agent for devitalizing pulps, the substance known as cobalt having taken its place. Since the cobalt probably kills by virtue of the arsenic contained therein, the question might naturally arise as to the advantages gained in its use. Experience has seemed to indicate that it is much less likely to cause pain, and that it is fully as effective as arsenious acid. In fact, the writer has found its action so perfect in this respect, that it has led him to oppose most vigorously the idea that cobalt could be applied to a pulp for twenty-four hours, and then any portion of the pulp-stump be sealed under a permanent filling with the hope that it would remain alive. Pulps will die—they will die perfectly dead to the apex after the application of cobalt. In experimenting with this agent, a record of twenty cases was kept, in eighteen of which the destruction was perfectly painless, and a subsequent experience in practice would go to show that this per cent. was not unusual. In the recorded cases, seven had been entirely successful without pain, when the eighth presented with the report of having suffered excruciatingly for twenty-four hours. In fact, the doubt was expressed as to which would die first—the pulp or the patient. Investigation showed extensive nodular growths in the pulp-tissue, which accounted for the difficulty. The other failure in the recorded cases was due to the same cause, and it is a well-recognized fact that pulps containing nodular growths are difficult to manage by any treatment.

The method of using cobalt is as follows: After complete exposure of the pulp is gained, a small pellet of cotton, less than the size of the head of a pin, is moistened slightly in one of the essential oils and carefully dipped into the cobalt. The moist cotton will pick up a minute quantity of cobalt, which is then carried to the cavity, and the cotton and cobalt placed immediately on the exposed pulp. Meanwhile the assistant has been mixing some oxyphosphate cement. This is flowed over the cotton to perfectly seal the cobalt in the cavity, great care being taken not to cause pressure on the pulp. In nearly every case of pulp-destruction, cement is used as the sealing agent in preference to gutta-percha. Cement admits of greater certainty of adaptation to the cavity walls, with less danger of pressure, and it has long been recognized that much of the pain occasioned in pulp-destruction is due to pressure.

A radical departure from the usual method is now taken in regard to the length of time the application is allowed to remain. Most practitioners, if we are to believe the literature of the subject, allow arsenic to remain only twenty-four hours,—none of them longer than forty-eight. Instead of this, it has for several years been the writer's custom, where molars and bicuspids have been under treatment, to allow cobalt to remain sealed in the cavity one week. The precaution is taken in anterior teeth to remove the cobalt in twenty-four hours, through fear of discoloration, though my experience with cobalt would lead me to be less fearful of discoloration in its use than with arsenious acid. It seems to interfere much less with the circulation in the pulp, and would therefore not be likely to cause the extensive disruption of red blood-corpuscles and the infiltration of the coloring matter through the tooth that we sometimes see where arsenious acid has been allowed to remain too long in a cavity. When the cement has been removed from an anterior tooth the cobalt is washed out of the cavity with one of the essential oils, the cavity dried, and a pellet of cotton saturated with the oil is applied for one week. This is again sealed in with cement, and in this connection I wish to emphasize the necessity for using cement as the sealing agent in the treatment of anterior teeth from the time they come under the operator's care till they are permanently filled. Hermetical sealing cannot always be easily accomplished with gutta-percha, and many a case of bad discoloration may be traced to leakage of the sealing agent during the process of treatment. This fact, together with others of equal importance, argues for an application of the rubber-dam in the management of pulpless teeth in all cases where there is not absolute certainty of dryness without it.

I am aware of the criticism that may be made on the practice of leaving cobalt sealed in a tooth for one week, but my clinical experience with it gives me so much confidence in the method that I wish to argue strongly in its favor. In doing so, I should feel it uncalled for before a society such as this to say a word of caution as to the necessity for being perfectly assured of security in sealing the agent in the cavity, were it not for the fact that some careless reader of the paper—and there are careless readers among dentists—might essay to follow the plan without attention to this important detail. In all my experience with this method I have never known of one case where the slightest injury has been done the gum-tissue through leakage of the cobalt under the sealing agent. In those cases which are most difficult to manage in this respect,—deep approximal cavities where the form of the gingival wall results in a sharp incline from the pulp-exposure rootwise toward the gum-tissue in the interdental space,—the gum is protected in advance of the application. If this precaution be not taken, the tendency is for the devitalizing agent to be forced down into the interdental space by the application of the sealing agent. The method of protecting the gum is by building a barrier of Gilbert's temporary stopping over the interdental space, reaching from the approximal surface of the adjacent tooth over the gum-septum and along the gingival wall of the cavity to near the point of pulp-exposure. Good adaptation to the gingival wall may be gained with Gilbert's stopping, not only on account of the pressure which is permissible against this wall, but because the preparation gets very soft and adherent with little heat. When the gum is protected by this bridge, the application of cobalt is made and sealed in position with cement. The latter becomes firm and rigid, preventing any dislodgment in mastication which might occur if the temporary stopping were used throughout.

The objects gained by leaving the devitalizing agent in a week are mainly two. The destruction of the pulp seems to be more complete when this is done, and the plan saves the time and expense, both to operator and patient, of an extra sitting. Seldom is a pulp in a condition to be readily removed after the application has been in twenty-four or even forty-eight hours, but it usually is at the end of a week. Thus when the agent is removed in twenty-four hours, the cavity must be re-sealed and the patient given a subsequent sitting for the removal of the pulp. The saving of this one sitting for each case of pulp-destruction amounts, in the aggregate, to a considerable item in a year's practice, and wherever the operator can consistently save the time of his patient, and still do the patient the best service, it is his duty to do so. It is along this line that some of the methods of practice to be outlined later in the paper on the treatment of certain conditions connected with pulpless teeth are based.

The dangers to be guarded against, and the probable objections likely to be urged, in the use of cobalt in this way, relate to its possible injury to the gum-tissue or to the tissues beyond the apical foramen. Protection to the former has already been sufficiently advocated, and danger to the latter when the agent is employed in the manner and quantity indicated is largely problematic. As has been intimated, only a minute quantity is used in each case, and a somewhat extended experience with the method has failed to give any indications of trouble from this source.

At the second sitting the rubber-dam is applied, the cement removed, and the cobalt washed out by flooding the cavity with absolute alcohol. This is then evaporated with the chip-blower till the cavity is dry, when a sharp bur is used to thoroughly open up the pulp-chamber. In doing this, the bur usually lacerates and cuts into shreds the main body of the pulp contained in the chamber, and this, together with the *débris* from the bur, is again washed out with alcohol. The openings of the canals can readily be discerned by evaporating the alcohol to dryness, and in passing I may say that the most efficient means of discovering hidden openings of small or badly situated canals under any circumstances is to flood the pulp-chamber with alcohol and use the air-blast till the chamber is quite dry. The alcohol will usually wash out any *débris* that may be plugging an opening in the case of pulps long dead, and in any event will at once disclose the position of the opening by the difference in color between the *débris* and tooth-tissue when dry. This plan has proved of the greatest service to me in at once disclosing the whereabouts of hidden openings which had long puzzled me on account of their unusual position, and which the broach had failed to find.

After the bulbous portion of the pulp is removed, the extraction of the portion in the canals may be facilitated by first absorbing as perfectly as possible the moisture from the remaining pulp-tissue. Alcohol, on account of its affinity for water, aids materially in this, and I have recently been employing it in the form of spray for this purpose, and also for drying pulp-canals previous to filling. The kind of apparatus used for producing the spray is one of the many devised for obtunding sensitive dentine, and was invented by Dr. Rust, of Chicago. I have found greater use for it in pulpless teeth than in sensitive teeth. Prior to the use of this instrument it was my practice to evaporate the alcohol with hot air, but my conviction is that with the spray we get an equal or greater degree of dryness without the unpleasant, and possibly dangerous, effect of the heat. My confidence in its efficacy was recently much strengthened by an unforeseen occurrence. I had just removed the bulbous portion of the pulp from a lower molar and found the canal contents quite moist and somewhat sensitive to the broach, when some one requested very urgently to see me for a moment in the reception-room. I instructed my assistant—who had meanwhile been preparing the spray apparatus for use in the case by heating the metal bulb—to direct the spray on the open pulp-chamber while I was gone. I was detained much longer than I had anticipated, but the assistant faithfully kept up the pumping during my entire absence. When I returned I found the remaining pulp-stumps so thoroughly desiccated and shriveled into leathery strips that there was not the slightest sensation in them and no difficulty in their removal. It will usually be found where pulps are moist and tear easily with the broach without readily coming away from the canal, that if dried in this way they will become tougher in fiber, smaller in caliber, and can be easily removed. Again, in those occasional cases where the pulp-tissue is sensitive to the pressure of the broach, even after the application of the most powerful devitalizing agents, we may control the difficulty in the same way. Pulps in this condition are never sensitive to the application of the spray, and in fact the most extreme changes of temperature do not seem to affect them in the least, no matter how sensitive they may be to the touch of the broach. Let such pulps be thoroughly desiccated by the use of alcohol as before mentioned, and it will be found that all sensation will be gone and the pulps in condition to be removed painlessly.

After the extraction of the pulp the canal is flooded with an antiseptic to destroy any putrefactive germs which may in one way or another have gained entrance to the canal. This is wiped out as perfectly as may be with absorbent cotton on a broach, and the canal again flooded with alcohol, which is in turn evaporated with the spray apparatus. When the canal is sufficiently dry it is filled, this being one of the cases where the writer is a believer in immediate root-filling.

Management of Pulpless Teeth having no Fistulous Opening.

In the treatment of teeth with pulps dead but with no fistulous opening, where there is any doubt as to whether or not a blind abscess exists at the end of the root, the case should invariably be treated as if there were one. The most expert operator cannot always determine in advance whether he has a case of blind abscess or simply a putrescent pulp-canal with no complications beyond the apex, and it is only common justice to the patient to proceed in the most cautious manner. In fact, these cases require the most careful management of any form of pulpless teeth.

There are two principal conditions calling for treatment under this head,—viz, cases where pulps have died under fillings or in sound teeth, and cases where decay has exposed the pulp and caused its death. In the former the operator must drill into the tooth to gain access to the chamber and canals, and in this connection one precaution seems always necessary. Formerly such cases frequently resulted in much trouble to the patient and chagrin to the operator, through the fact that teeth which, previous to interference on the part of the dentist, had been perfectly comfortable, immediately took on inflammatory action and often ran to a distressingly bad abscess. The precaution necessary to avoid such a result relates to thorough antisepsis from the very beginning of the operation. The rubber-dam should be applied before any drilling is attempted, and an antiseptic placed near at hand for immediate use the moment the pulp-chamber is penetrated. This antiseptic should be non-irritating and non-effervescing. It should be a non-irritant, because irritation either medicinal or mechanical is dangerous, and it, above all things, should not be an effervescing agent, because the very act of effervescence is too likely to force septic matter lying in the canal through into the apical space. The least disturbance we set up in the apical third of the canal at this first sitting the greater our chances of avoiding trouble, and I am much opposed to the practice advocated by various writers of using hydrogen peroxid, pyrozone, or similar agents thus early in the treatment of pulpless teeth having no fistulous openings.

As soon as the chamber is reached by the drill, it should at once be flooded with the antiseptic, care being taken not to cause any pressure upon the contents of the canals The slightest particle of septic matter forced through the apical foramen at this stage of the operation may cause serious trouble. When the antiseptic has had time to mix somewhat with the contents of the chamber, a bit of absorbent cotton or bibulous paper may be lightly applied to the opening to absorb enough of the antiseptic to admit of drilling to enlarge the opening. The absorbent will usually bring away some of the putrescent contents of the chamber in addition to the antiseptic, and when the opening is sufficiently enlarged the chamber may repeatedly be flooded, and the contents absorbed in this way till the greater part of putrescent matter has been removed from the chamber and larger portion of the canals without causing disturbance at the apical foramen. When this process has been carried to the limit of safety, the cavity is flooded with absolute alcohol for its dehydrating effect, and this evaporated to dryness. This step in the operation seems to the writer to be of the utmost importance. It must be manifest that the dryer we get the canals the less chance there is for micro-organic life to exist, and that when an antiseptic is applied the greater will be the amount taken up by the tubuli. Care should be exercised, however, that the crown of the tooth be not heated too hot in the process of drying the root, and that it be not kept dry too long, for fear of injury to the tooth-structure through checking. It is with this possible danger in mind that I have nearly abandoned the use of hot air in these cases and substituted the alcohol spray. As before intimated, it seems to extract moisture from the canals without heating the tooth up perceptibly. This danger to the crown of the tooth may also be considered an argument in favor of the use of the root-canal drier whenever it is found practicable, and wherever it is felt that there is no danger of causing apical irritation by its use. When dryness of the canals is obtained, they should once more be flooded with an antiseptic, this time to remain sealed in the cavity till the next sitting. The canals are left filled with the medicament, but no cotton is forced into them at this time. A small pledget saturated with the antiseptic may be placed loosely in the chamber, and the opening closed with gutta-percha.

If the operation has been carried through thoroughly and carefully, and if the putrescence seems to have been overcome by the treatment, the case may be dismissed for one week, with instructions to the patient to return at once if trouble ensues. Where any doubt is felt as to the degree of control obtained in the case, the patient should be seen in twenty-four or forty-eight hours, and the dressing changed. At the end of a week, if no symptoms of irritation have been felt, and if the canals are sweet and clean on the removal of the dressing, the roots may be filled. Before this is done, however, the canals should first be washed out with alcohol, dried, flooded once more with an antiseptic, wiped out, flooded with alcohol, and dried. They are then ready for the filling.

In cases where the pulp has died as the result of exposure from decay, and the canals have for long been subject to septic influence, the same general treatment may be followed, with the one slight variation that in cases of extensive decay, with much infected and softened dentine remaining, the softened portion may be burred out or removed with excavators, and washed away with a syringe before the rubber-dam is applied. In this way much filth may conveniently be gotten rid of by way of the spittoon without the operator coming in too close contact with it.

In treating those cases having no fistulous openings, if the dressing after the first treatment shows indications that there is a blind abscess in the apical space through a weeping of pus into the canal, the treatment should be continued till all such weeping stops and the abscess heals. In chronic, persistent cases of blind abscess, where large quantities of pus flow into the canal and flood the entire cavity on removal of the dressing, the treatment is to remove all of the pus possible by absorbing with cotton or bibulous paper, and by "coaxing" with a broach. When pus is flowing in such profusion it is an indication that the apical foramen is large, and there is less danger of causing irritation by the use of the broach in this region than in an ordinary case of septic canal without a flow of pus. It is therefore advisable to manipulate with the broach quite freely in the attempt to empty the abscess of all pus, and it is even in some cases desirable to carry this manipulation to the point where pus stops and blood begins to flow. When the operator succeeds in getting a good flow of blood, he may then wipe out the canal with a broach wrapped with cotton and dipped in some non-irritating antiseptic, and when the canal is sufficiently free from blood it may be packed to the apex with cotton saturated with the antiseptic. This should be allowed to remain a week undisturbed if it causes no uneasiness. Nature should be given time to repair the injury, and nature will very often do much for us in these cases if we give her the opportunity. These are the cases where much harm is often done by over-treatment.

If a tooth in this condition will remain tightly packed for a week without trouble, and if the canal is dry and the dressing sweet on removal, the root may be filled.

Management of Pulpless Teeth with Fistulous Opening.

First the soft, decalcified, infected dentine should be cleaned from the cavity, and the pulp-chamber thoroughly opened up. The putrescent contents of the canals should be removed as perfectly as may be by way of the cavity, to accomplish which the chamber and canals should be flooded with an antiseptic, and this absorbed with cotton or bibulous paper. When the canals are cleaned the abscess should be injected with the antiseptic through the canal, and the process kept up if possible till the medicine appears at the fistulous opening on the gum.

The best means ordinarily to inject an abscess is to pack the canal tightly with cotton saturated with the medicine, and then force down upon it a mass of rubber such as is used for vulcanizing plates. A degree of force can be exerted by this method in exactly the place required, to better advantage and in less time than by any other means known to the writer. In cases where there are several canals, and it is intended to inject only one of them, the others may be left empty, and the force against the rubber directed in line with the packed canal.

When the medicine appears at the fistulous opening, if the case is one of recent occurrence, the cavity may at once be sealed,—after replacing the cotton in the canal with freshly saturated cotton,—and the patient dismissed for one week. If the case is one of long standing, where the dentine of the root seems much infected, it is best after the injection to flood the canal with alcohol and evaporate to dryness before applying the antiseptic and sealing the cavity. This insures a more thorough saturation of the tubuli with the antiseptic, and the tooth will return in sweeter condition than if the drying had been omitted.

At the end of a week all ordinary cases of abscess will be found cured if this practice has been followed faithfully. When the patient returns, and the fistula is found perfectly closed, the root may be filled at this sitting, the same process being followed prior to filling that was advised in the case of roots without fistulous openings.

If the case returns with the fistula still discharging, a change in the procedure is called for. In the use of an antiseptic at the first sitting, one has been selected which is diffusible and which is not strongly escharotic. Usually Dr. Black's 1, 2, 3, is employed; and it is felt that if care had been exercised in thoroughly cleaning the canal, in evaporating the moisture from it, and subsequently sealing the antiseptic in the canal for one week, the canal itself is in a condition which would not account for the persistence of the fistula. The trouble is probably beyond the apex, and the tissues at that point require more vigorous medication than that applied at the first sitting. They need stimulation and cauterization to break up the chronic condition. With this idea in view, carbolic acid, ninety-five per cent., is injected till it appears at the fistulous opening. The canal is then packed with cotton saturated with carbolic acid, the cavity sealed, and the patient dismissed.

If there has been much discharge with a free opening, pyrozone, three per cent., may be injected prior to the use of carbolic acid. A case of this kind should be sealed for a week, and the treatment repeated if the fistula is found open at the end of that time. In cases where the discharge is slight, the case should be dismissed for two weeks after the second sitting. Frequent treatments should be avoided, unless there is a copious flow of pus indicating a rapid breaking down of tissue. Then the case must be fought vigorously, the treatment being directed by way of the fistulous opening instead of through the tooth.

In chronic cases of slight discharge, where a third treatment has been found necessary, the dressing in the canal should not be disturbed for a month. The operator may see the patient at intervals in the mean time, and if he deems it necessary may treat the fistula through the opening ; but in very many of these cases no treatment at all is preferable to any treatment.

A vast majority of all abscesses, chronic or otherwise, coming under the care of the dentist will be cured by the treatment herein outlined, but an occasional case will present itself where other treatment is demanded on account either of extensive caries of the alveolus around the apex, or the denuded end of a root over which the tissues refuse to heal. The former condition calls for one of two methods of treatment,—dissolving out the carious bone and stimulating the parts to healthy action by the use of medicines, or burring out the bone surgically. The choice of methods must be left to the operator. When a root is found rough and denuded on the end, it should be scraped and smoothed with suitable instruments. I am opposed to the practice advocated by some operators of cutting off a portion of the apex of the root, unless it be found absolutely necessary. My opposition is based on the fact that in one or two instances the most careful management of the case failed to secure a perfect filling in of the opening with healthy granulations. This applies particularly to lower teeth, where drainage is difficult, and where foreign material is subject to lodge, no matter how carefully the opening is plugged. Most of these chronic cases may be successfully managed without cutting off any considerable portion of the root.

Management of Small and Tortuous Canals.

The essayist approaches this phase of the subject with some diffidence and humiliation, in the light of occasional claims made by operators that they can fill all canals successfully to the apex. He is not of that guild. He believes he has seen too many sections of roots and has ground too many sections himself to give him license to say that such a thing can be done by him. He is not blind to the possibilities of expert manipulation, and believes that many roots may be filled that remain unfilled because the operator has not risen to the occasion and accomplished all that might have been accomplished. But there are limits to human possibilities, and a man has only to encounter a certain class of pulpless teeth, under the varying conditions with which they are presented to us in practice, to occasionally touch that limit. Even if it were possible by the most persistent and nerve-straining application to follow all canals to the apex, and to enlarge them sufficiently to receive the kind of root-filling sometimes advocated by those who claim to successfully accomplish this result, the practice might consistently be termed in many instances a case of "love's labor lost." All canals do not require to be drilled out and filled solidly to the apex in order to remain perfectly comfortable and satisfactory to the patient. This has been demonstrated in numberless cases, and requires no argument. On the other hand, no man is doing his full duty who fails to make an honest effort to fill all canals that can be filled with a reasonable degree of skill and application, or who neglects to sterilize as perfectly as may be every canal that he cannot fill.

The means of discovering hidden openings of small canals has already been detailed in the paper. When such an opening is found, the orifice should be sufficiently reamed out to give an indication as to the size and direction of the canal. A small stiff broach should then be used to explore the canal as far as possible, and when the broach refuses to go any farther after conscientious effort, it may be taken for granted that the caliber of the canal is so small that little or no trouble will supervene as the result of failure to clean beyond the point reached by the broach. An antiseptic should be worked well up into the canal by flooding the chamber and manipulating with the broach. Tortuous canals are followed to the best advantage by taking a small, freshly filed, smooth broach of piano-wire, and curving it from time to time to follow the curve in the canal. There is little danger of breaking a broach of this kind in the canal, no matter how much of a curvature it may have. In the attempt to fill such canals as these it is folly to use any material which is not semi-fluid on its entrance ; something which cannot be pumped into position and worked into inequalities and interstices with the broach. Such materials as gold, lead, tin, wooden points, medicated cotton, etc., are contraindicated here if nowhere else. This leads us to the question of

Filling Roots.

Much has been written upon the various materials advocated for this purpose, but in a general way that material which can be manipulated to the best advantage by each individual operator is the material for him to use. This with the limitation, however, that some materials advocated exhibit fundamental objections that cannot be overlooked. Gold, for instance, requires too great an expenditure of time and energy, even in those cases where free access is attainable. Wooden points are contraindicated on account of lack of conformity to irregular surfaces of canal-walls, and because their removal is difficult whenever such a procedure is found necessary. Metal points are open to the same objection of lack of conformity, and also to the danger of penetrating the apical space with the sharp point. Cotton—well, cotton, medicated or not medicated, is simply an abomination. Its absorptive properties argue sufficiently against its use, even if it could be successfully carried into tortuous and intricate canals. It is essentially not a sealing agent, and has no place as a permanent root-filling.

The intimation is not here intended that successful root-fillings have not been made with each of these materials, but it is confidently asserted that when there are other materials in our hands containing all of the virtues of these, with none of their objections, it should not be considered an evidence of the best judgment to follow the exclusive use of any of them. The writer has no particular pet hobby to advance, but uses in his own practice gutta-percha points as so often described. The lubricant employed in advance of the points is a solution of gutta-percha in eucalyptol instead of in chloroform. The choice of materials is based on the fact that eucalyptol is less irritating than chloroform, and the solution may be kept in a bottle with less frequent evaporation. It is therefore always ready for use. The criticism may be made that the failure to evaporate rapidly is an argument against the eucalyptol solution, but in a practical use of it this objection is found to be invalid. A very small quantity is used, merely enough to lubricate the canal, and the cone of gutta-percha is pressed into it with gentle but prolonged pressure, till all excess is forced up alongside the cone, and is wiped out with a pledget of cotton.

In this connection it is well to state the necessity of using a warm instrument in pressing the cone to place, to the end that the gutta-percha is somewhat softened. All inequalities in the canal will be more perfectly filled in this way than with a cold cone. The use of the eucalyptol solution in this manner for several years has seemed to indicate that there is less likelihood of the temporary soreness so often complained of by operators who use chloro-percha. Chloroform is more or less of an irritant, and the apical tissues surrounding some roots are so susceptible of irritation that the slightest disturbance, whether with medicines or instruments, is likely to cause trouble for several days, if not longer. It has been the rarest exception with the writer in recent years to have any complaint of soreness after root-filling.

RÉSUMÉ.

The writer believes in cobalt for the destruction of pulps. He does not believe in leaving pulp-stumps in the roots of teeth after the application of cobalt, with the idea that they will live, or that they may be sufficiently sterilized to remain healthy. He believes in absolute alcohol for dehydrating pulp-canals, and considers dryness a *sine qua non* to successful treatment. He is not alarmed at the result of any possible coagulating properties of the alcohol when used as advocated. He is opposed to over-treatment, believing that continued operative interference often results in irritation which prolongs the disease. He believes in economy of time both to patient and operator, consistent always with the most thorough work. He believes that most abscesses may be cured with one treatment, but recognizes the chronic cases that require time and patience. He believes in an attempt being made to fill all roots of pulpless teeth, but does not believe all roots can be filled. He has offered his ideas in the present paper not because they possess originality, but because they have proved to him highly satisfactory in the management of a large number of pulpless teeth.

THE POSSIBILITIES OF SYSTEMIC TREATMENT OF DENTAL DISEASES.

BY L. ASHLEY FAUGHT, D D.S., PHILADELPHIA, PA.

(Read before the New Jersey State Dental Society, July 19, 1894.)

IN speaking to you of the possibilities of systemic treatment of dental diseases, I am not discovering to you any unknown country. As dentists, we all know that the realm exists. It is presented to our notice in the college curricula at the very threshold of dental instruction, but with the large majority it soon becomes a by-path as they tread the broad highway of general practice. I am simply inviting you to study with me awhile aside, and see the good and beautiful which opens on every side as we advance. Perhaps I may be able to induce a sufficient number to walk this by-path often enough for it soon to become one of our highways.

It was my privilege, in May, 1892, to make before one of your sister assemblies "A Plea for More Scientific Professional Methods," in which I presented a table of some twenty cases of the variations from normal in the temperatures of patients submitting to various dental operations, and said, "The nervous condition of the patient, therefore, is a factor in the results of dental operations, and far more successes and less failures would be met if the dentist would adopt *proper medical systemic* treatment before and after operations." This was the first time that anything of the kind had been submitted for investigation at the hands of the profession. Two years have elapsed, and it is now my intention to recall that study, in the hope that I may be able to gather the experience of other investigators if it haply provoked the attention which in my judgment it deserved.

Dentistry of the present day is scientific in its methods of practice, and capable of something more than the scraping out of a little decay and the stuffing in of a little gold. The manipulative and that which is merely mechanical routine has indeed large part, but there is much besides. It is for us one and all to recognize and use more frequently, a high essential, our prerogative, the practice of systemic dental medicine. The intelligent dentist should ever enlist this aid for his patients in the care of his cases. True it is that at first some difficulty will be met in inducing them to use our prescriptions, but this I know from experience can be overcome, for our patients soon learn how great is the benefit afforded, and confidence becomes increasingly established.

For my own part, I cannot understand how a conscientious practitioner of dentistry can properly treat the patients submitting themselves to his care without a full recognition that dental organs are a portion of a complicated organism, and that the very condition, which primarily requires manipulative treatment, is produced in large part by the influences of the general system. To repair the local organs without treating this system is to invite further recurrence of disease. It indeed is to efface temporarily the effects and to ignore the cause, and our duty to our patients is not wholly discharged.

A few papers analogous to the one I am now reading have been presented to the profession in times past, but they differ in one essential particular. May I ask you to note particularly the difference? They have all advocated that the dentist "*should be able* to make recommendations for general physical ailments affecting the organs given into his care." The point which I wish to impress is not that the time has come when we should be able, but that now is the time in *which we practice systemic dental medicine*. The whole education of the dentist to-day renders him competent, and the mouths of our patients are a crying demand for the expression of such competence. He who fails in any case to give this systemic treatment fails to practice dentistry. Such a one is governed by a "spirit of mischief-making and money-getting," and is following "abominable practices which cover the profession with disgrace."

The dental diseases in which there are possibilities of systemic medical treatment are perhaps to be classified as follows:

First, all the manifold conditions of the nervous system as related to all the usual operations at the chair connected with restoration of lost tooth-tissue.

Second, dentition.

Third, the treatment of acute abscess.

Fourth, the treatment of exposed pulps and neuralgic states.

Fifth, prophylactic conservation of tooth-tissue.

Sixth, pyorrhea alveolaris.

While perhaps it would not be unprofitable to many for me at this time to enter upon a detailed consideration of the various drugs indicated, still it would be quite impossible to do the subject proper justice.

The practitioner of dentistry to-day being familiar with the action of the following medicaments, is to select and use the one best applicable. I here enumerate the list I have in daily use :

Tinct. opii, tinct. opii camph., morphiæ sulphas, asafœtida, ammonii valer., chloral, cinchona syrupus hypophos., potassii bromid., tinct. digitalis, spir. ammonii arom., aconitum, liquor ammonii acetat., hydrarg. chlorid. corros., hydrarg. chlorid. mite, ammonii chlorid, belladonna, gelsemium, sodium salicylate, ammonium salicylate, lithia carb., pepsin, gentian, acid nitro-muriatic, strychnin, sodii bicarb., lime-water, podophyllum, castor oil, cascara sagrada, alcohol in the various forms, and phosphoric acid *dil.*

I do not by any means presume that these are the only drugs available in a dental systemic pharmacopœia, but with them I can successfully cope with the classification of diseases I have made. They are a good foundation, and perfect familiarity with them is an essential feature of great advantage. It is better to be able to use a few weapons with skill than to attempt to wield many at great disadvantage. The dentist is to comprehend that physicians never use the whole pharmacopœia ; that each physician uses but a limited list of medicaments, and rarely strays aside from them. They meet his individual use, and with them he practices successfully. Under special urgency he may try an additional remedy ; so will the successful dentist vary his list from time to time.

When I had reached this stage in my writing, I was surprised and delighted to find that the same subject was to be presented to the profession at the meeting of the Pennsylvania State Dental Society, by Professor Litch, under the title "Systemic Treatment in Dental Practice." It is a pleasure to be able to state that my own views were found to be fully in accord with the views of this distinguished author. He strongly advocates the use of opium in its various forms under conditions whereas in times past we so frequently think of aconite or veratrum viride. The whole weight of his testimony was that opium was to be considered by far the safer and more efficient remedy. The discussion of this paper clearly indicated the effect which the more general adoption of systemic treatment in dentistry will have on the future status of the profession. As long as dentistry trends toward the purely mechanical and manipulative, it will trend toward cheapness, both as regards the service and the fees ; for the general public can comprehend it, and for apparent reasons will so have it. The instant we engraft upon dentistry the mystery of general medicine, from that moment it will be elevated both in the service and the fees ; for it passes beyond the realm of criticism by the general public.

Before concluding, gentlemen, I cannot forbear making a few remarks on one or two drugs and compounds which I have found peculiarly happy in their effects. In seeking the help of systemic treatment, it is ever to be borne in mind that medicines act on the body at large in three ways,—first, by their control of tissue waste and repair; second, by their direct effects on the various organs; and third, by their effect on the various secretions and excretions. Selection of a drug is therefore to be made with one of these effects in definite view. Take, for instance, that condition of stomatitis connected in elderly persons with a strong bilious temperament. The mucous membrane is dry, and the tongue heavily coated. Any operation on the teeth involving the use of rubber-dam or napkins will have each sitting followed by an aggravated exhibition of oral ulcers. I have had the most happy results follow the use of—

℞—Nitro-muriatic acid *dil.*, gtt. x;
Tinct. gentian comp., f℥ ii.

after meals, coupled with the use of a teaspoonful daily of Parke, Davis & Co.'s maltine with cascara sagrada. Here, in the first place, treatment is directed toward the action of the liver, and in the second place to obtain a laxative effect upon the intestinal tract.

In those conditions in which nervous females show marked lack of nervous tonicity, through weakness or dread of the operation, thirty to sixty drops of the aromatic spirits of ammonia, administered in a little water at the time of their taking the chair, has most markedly afforded relief and made comfortable what would otherwise have proven a severe strain.

In acute abscess, the prompt exhibition of cinchona in large doses of fifteen grains (with due regard to the idiosyncrasies of the patient) is indicated, together with the use, during the feverish, protracted nervous condition at night, of liquor ammonii acetatis; and the occasional sipping of a glass of water in which has been placed twenty drops of tinct. opii.

This method of using opium I have found peculiarly happy, its concomitant use with cinchona affording in many cases of such inflammation the promptest relief. Since the publication of my article on "Uric Acid and the Dental Diseases of the Gouty Diathesis,"* I have been experimenting in this direction with phosphoric acid *dil.*, and while the treatment is not yet sufficiently prolonged to give expression at this time to more than a tentative statement of results, still those results have in some cases been so marked as to argue well for the use of the drug, used in sufficient quantity,—say, one hundred drops in the twenty-four hours. The most cloudy urine has been cleared of its excessive deposits of the carbonate and phosphate of sodium. The advantage of this can be comprehended when one recalls that in concretions their bases are used for the crystallization of uric and oxalic acids. In addition, there may possibly be a direct supply of material with which to repair broken-down nervous tissue.

It is not my intention, however, to lecture to you on therapeutics or to bring coals to Newcastle. I can only ask at your hands an earnest consideration of the general subject, and the prompt and general introduction into dental practice of systemic dental medicine.

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* See DENTAL COSMOS for June, 1894, p. 439.

DR. HEWITT'S METHOD OF USING NITROUS OXID AND OXYGEN AS AN ANESTHETIC MIXTURE.

BY EDWARD C. KIRK, D.D.S., PHILADELPHIA, PA.

(Read before the Academy of Stomatology, November 13, 1894.)

THE successful production of a state of true anesthesia, without asphyxial symptoms, by a mixture of oxygen with nitrous oxid is an accomplished fact which would seem to necessitate a revision of our views respecting the physiological action of pure nitrous oxid. It is pretty generally conceded that nitrous-oxid narcosis is accompanied by, if indeed it is not entirely dependent upon, the element of asphyxia, so markedly evident in all or nearly all cases of gas-administration. Cyanosis, stertor, jactitation, are signs, more or less pronounced, which are the usual concomitants of nitrous-oxid narcosis, and which there can be no reason to doubt imply, and are due to, oxygen-starvation or asphyxia. Practical experience, involving unnumbered thousands of cases and showing an astonishingly low percentage of fatalities, seems to warrant the assumption that we may waft a human being to the very verge of vital dissolution by this method of cutting off his supply of oxygen with but slight danger of a fatal result. Yet occasionally a death has followed upon the exhibition of nitrous oxid, and though in but few of the cases reported has the asphyxial element been shown to be the cause, there can be no reason to suppose that it was not a potent factor. Notwithstanding the many inquiries and carefully conducted investigations which have been made respecting the physiological action of nitrous oxid, no observer has ever charged it with presenting any other dangerous feature than its power to asphyxiate. That it can and does produce death by asphyxia, no one who has ever experimented with it, or is familiar with the literature of the subject, can for a moment doubt. The fact has been proven by many observers, and any one can easily verify it by an experiment upon one of the lower animals.

It is claimed by some, however, that the anesthetic property of nitrous oxid is not wholly due to oxygen-starvation; or, otherwise stated, the gas possesses the power to induce anesthesia quite independently of its asphyxial element. Two facts support this latter view,—viz, first, that true anesthesia can be induced by a mixture of oxygen and nitrous oxid in which the oxygen is present in amount sufficient to prevent asphyxia, as has been successfully accomplished by M. Paul Bert, of Paris, Dr. Hillischer, of Vienna, and Dr. Frederic Hewitt, of London; second, a similar condition of true anesthesia can be induced and maintained by a judicious admission of atmospheric air during the anesthetic procedure, which is the method advocated and successfully practiced by Dr. J. D. Thomas, of this city. In the narcosis produced by either of the methods alluded to, when correctly carried out, there is entire absence of the usual classic manifestations of asphyxia. It would seem, therefore, in view of these facts, that we must modify to some extent our conclusions regarding the physiological action of nitrous oxid, or alter our ideas concerning the symptoms of asphyxia. In the DENTAL COSMOS for May of last year, Dr. H. C. Wood presented the results of some experiments upon dogs which had been subjected to inhalation of pure nitrous oxid and of a mixture of oxygen in varying amounts with nitrous oxid, for the purpose of studying the effects of oxygen upon the anesthetic process. In connection with the anesthesia experiments a series of studies of certain of the phenomena of mechanical asphyxia were included as control tests, for purposes of comparison. Dr. Wood reiterates in the beginning his published belief that nitrous oxid acts as an anesthetic by shutting off oxygen, and bases his belief on the following facts: that, as established by Jolyet and Blanche and by Elihu Thompson, an animal will live in nitrogen or even in a vacuum as long as in pure nitrous oxid; that, as he has himself shown, the circulatory phenomena of nitrous-oxid anesthesia are very similar to those which are caused by inhalation of pure nitrogen, or mechanical asphyxia; that, as he, as well as the French observers cited, has shown, the addition of sufficient oxygen prevents any anesthesia; and finally, as shown by the French observers, coma is not developed until the oxygen in the blood is reduced to three or four per cent.

The first proposition is a matter of fact, and is in accordance with what we know of the properties of the gas. It contains oxygen, but in a state of chemical combination, which in the process of respiration is not dissociated, but leaves the lungs in the same chemical condition as when taken into them. Hence it is not capable of supporting life, and hence also, by replacing the oxygen already in the circulation, it produces oxygen-starvation or asphyxia. Dr. Wood's second observation is a corollary of his first. Nitrous oxid being an asphyxiating agent, the circulatory phenomena produced by its inhalation must necessarily be identical with, or very similar to, those produced by the inhalation of pure nitrogen, or by mechanical asphyxia. His third proposition is misleading, and needs qualification. It is undoubtedly true that the addition of sufficient oxygen to nitrous oxid prevents any anesthesia, but it is also equally true that the addition of sufficient oxygen will prevent asphyxia while it will not prevent anesthesia. The term sufficient is in its very essence a relative term, and is about as ambiguous a standard of quantitative measurement as is "a piece of chalk" when used without limiting conditions. The statement of Jolyet and Blanche, "that coma is not produced until the oxygen in the blood is reduced to between three and four per cent.," we may accept as correct, but the relation of this fact to the admixture of oxygen with nitrous oxid in the anesthetic procedure is modified by several variant factors, which will need careful study before its practical importance can be clearly made out. The comparative diffusibility of the two gases, dependent upon their relative densities, probably has a most important bearing upon this point.

Dr. Wood deduces from his experiments a confirmation of the theory that nitrous oxid produces anesthesia by cutting off the supply of oxygen, and also the conclusion that "a mixture of nitrous oxid and oxygen does not seem to be available as a practical anesthetic." In the experiments reported, two mixtures, in which three and five per cent. respectively of oxygen with nitrous oxid were used, five dogs were subjected to the experiments. Anesthesia was produced in all the cases with one exception,—viz, of one dog where a five per cent. mixture was exhibited. The failure to produce anesthesia in this single instance must have been due to some factor not included with the other cases, as in the four other dogs subjected to the same mixture complete anesthesia was induced. The characteristic feature of the process, as compared with that when pure nitrous oxid was employed, was a marked lengthening of the time required to induce the anesthetic state. This fact Dr. Wood considers strongly in evidence of the truth of the theory that nitrous-oxid anesthesia is due to shutting off of oxygen. Dr. Hewitt has shown repeatedly that it takes a much longer time to induce anesthesia in the human subject by the mixture of nitrous oxid with oxygen than when pure nitrous oxid is used, in which respect his experience agrees with the result of Dr. Wood's experiments. There is to be noted in this connection that while it takes longer to induce anesthesia with the oxygen and nitrous-oxid mixture than with nitrous oxid alone, the resulting anesthesia is of longer duration where the mixed gases are used. Dr. Hewitt's figures relative to this point are as follows :

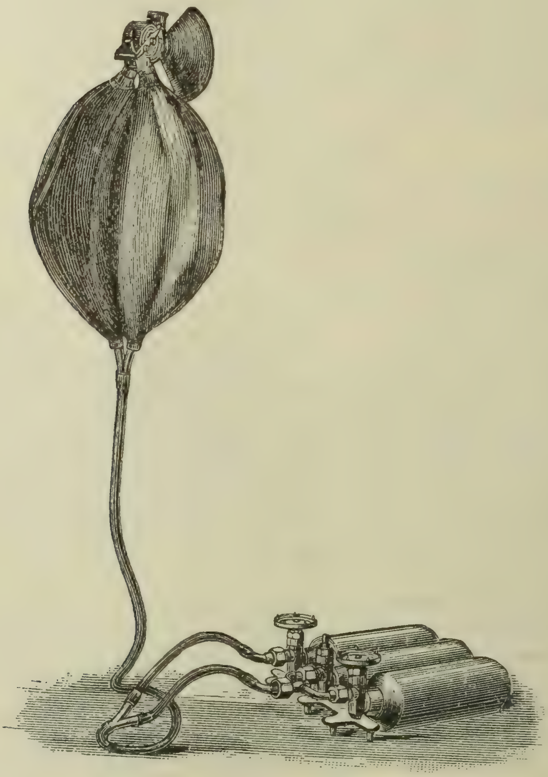
	Average Period of Inhalation for Dental Operations.	Average Period of Resulting Anesthesia.
N_2O *per se* . . .	About 51 seconds.	30 seconds.
N_2O+O in sufficient quantity to prevent all asphyxial symptoms.	About 110 seconds.	44 seconds.

In typical cases of anesthesia by mixed oxygen and nitrous oxid, there is entire absence of cyanosis, stertor, or jactitation, which we are told are the characteristic symptoms of asphyxia. It is this fact that gives color to the theory that nitrous oxid possesses anesthetic properties apart from those which it induces by virtue of its shutting off of oxygen. According to Jolyet and Blanche, as before noted, coma is not produced until the amount of oxygen in the blood is reduced to between three and four per cent. When so reduced, we have cyanosis as a concomitant.

I have been unable to find any record of observations showing the amount of oxygen in the blood under anesthesia by the mixed gases ; but if the absence of duskiness of the features may be relied upon as an indication, there is certainly a greater amount of oxygen than four per cent. present. Again, anesthesia by means of the mixed gases may be prolonged with safety for a much greater period than with nitrous oxid alone. M. Claude Martin, of Lyons, administered to a dog a mixture of nitrous oxid with fifteen per cent. oxygen for three consecutive days, with apparently no ill effects upon the animal. It must be evident, then, that we have to deal, in the case of the mixed gases, with an anesthetic which does not induce asphyxia ; or, if so, the condition is modified to an extent which obliterates its ordinary characteristic symptoms. It is also evident, for this reason, that it possesses greater freedom from danger. If it can be demonstrated that the anesthesia induced by the mixture of nitrous oxid and oxygen is nevertheless caused by the action of insufficiently oxygenated blood upon the nerve-centers, notwithstanding the entire absence of all of the usual symptoms of oxygen-starvation, we may strongly suspect that other well-known anesthetics act in an analogous way by interfering with proper oxygenation of the blood.

The experience of many observers, but especially that of Professor Hillischer, of Vienna, and Dr. Hewitt, of London, demonstrates the fact that a mixture of oxygen with nitrous oxid may be practically utilized as an anesthetic, and that such a mixture is in all respects the safest and most satisfactory agent at our command for minor surgical operations. It enables us to utilize the anesthetic feature of nitrous oxid without its one element of danger,—viz, its tendency to produce asphyxia. While the records show that the asphyxial factor of nitrous-oxid narcosis is but a slight element of danger in its use,—for no anesthetic has been so largely and indiscriminately used,—it is still important that we should take advantage of any means which will successfully eliminate this one dangerous feature. The method and apparatus devised by Dr. Hewitt fully meet all practical requirements, and though somewhat more complicated than the ordinary nitrous-oxid apparatus, is sufficiently simple and convenient.

FIG. 1.

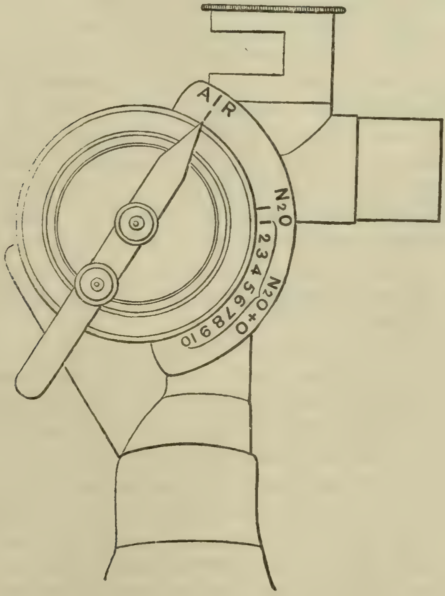


Showing the complete apparatus of Dr. Hewitt for administering mixed nitrous oxid and oxygen.

I had the opportunity this last summer of seeing Dr. Hewitt administer the gas in the London Dental Hospital, and was sufficiently interested in the method to bring over with me his complete outfit. (See Fig. 1.) The apparatus consists of a set of three steel bottles or cylinders, two of which contain compressed nitrous oxid, and the third oxygen. The oxygen cylinder I have had painted red, and the other two are black. The nitrous-oxid cylinders are yoked together by a tube coupling, so that either one can be utilized. The necessity of having two cylinders of nitrous oxid and one of oxygen grows out of the fact that considerably more than twice as much nitrous oxid as oxygen is used during the inhalation.

The gases are conveyed by separate tubes to the mixing-chamber, which forms a part of the mouth-piece. They run from the bottles apparently into a single tube, but it is in reality one tube within another. The outer tube carries nitrous oxid, and the inner tube oxygen. The gases are then led to a compound bag, which is made double by a partition or septum. The oxygen side is marked by a white inlet tube, and the nitrous oxid by a black one. The gases pass separately from the cylinders up to the valve which constitutes the mixing-chamber (Fig. 2). On the oxygen side of the mixing valve the gas is delivered through a series of very small perforations, and on the nitrous-oxid side the gas is delivered to the center of the mixing-chamber.

FIG. 2.



Showing arrangement of the mixing-chamber, with dial and valve for controlling the relative proportions of the gases.

With the valve open and the face-piece in position, the patient breathes air through an opening in the outer surface of the mixing-cylinder. The valve-key is then turned and stopped at the nitrous-oxid mark, which is the first division upon the dial, and is there lightly held in position by a detent spring. The patient now breathes pure nitrous oxid. He is allowed to take one, two, or three breaths of nitrous oxid, according to his physical condition; then the key is passed on through the several divisions on the dial, which are arranged in the arc of a circle from one to ten, each number signifying an additional hole through which oxygen may be caused to pass. It will be seen that by this arrangement the patient inhales a constant steam of nitrous oxid to which is added a continually increasing quantity of oxygen. Ordinarily the patient is allowed to take two or three breaths of pure nitrous oxid, and is then passed on quite rapidly to one, two, three, four, five, six, or more numbers of oxygen, as the case may require. Often with anemic persons, who evidently need oxygen and such as would be bad subjects for pure nitrous-oxid anesthesia, they are given more oxygen, or oxygen is admitted from the beginning. If there be any tendency to come out of the anesthetic state, the indicator is turned back one or two notches, so as to reduce the quantity of oxygen, the amount being graduated according to the needs of the case. Anesthetization will average ninety to a hundred seconds before the case is ready for operation.

I saw, in company with Dr. Darby and Dr. Cryer, ten or a dozen cases operated on by Dr. Hewitt and by his assistant. We were each struck with the sleep-like character of the anesthesia induced by this method. It seemed to be more like natural, normal sleep than any condition I have ever seen under an anesthetic. During the anesthesia there was no jactitation and no cyanosis, excepting a slight indication of duskiness in cases where the anesthetic was given rather rapidly, but it passed away under increased additions of oxygen.

As far as we had opportunity to observe, we were all impressed with the superior results which Dr. Hewitt showed us, and I have considered the matter of sufficient interest and importance to bring before you in this way.

I have felt also that but few of us fully understood how nearly this method has been approached and carried out by the method practiced by Dr. Thomas, in which atmospheric air is substituted for the oxygen. He works without the face-piece, and, as most of you know, he uses the nose as a valve by which atmospheric air is admitted to relieve the oxygen starvation as the case demands it. In his hands it is a perfectly satisfactory and intelligent use of that method. It is one which he has been familiar with and has practiced for many years; but one advantage for general use I see in this, over the method Dr. Thomas uses, is that it gives an almost definite scale by which the administration of the anesthetic can be gauged, and it does not require special instruction to enable one to apply it successfully.

There is one other peculiarity of this apparatus that is new to us in America, and that is the method of operating the valve of this gas apparatus by a key with the foot, instead of having to do it by hand. I consider the foot key a decided improvement over our hand valve.

A POSSIBILITY IN TOOTH-FILLING.

BY SIGEL ROUSH, M.D., D.D.S., WASHINGTON, D. C.

To apply the principle of electro-plating to the filling of human teeth may be a Utopian dream, but the writer in his experiments has obtained results sufficiently satisfactory to warrant him in believing it can be successfully accomplished. Electro-plating, as the reader doubtless already understands, is the process of transferring, by means of an electrical current passed through some disintegrating solution, infinitely small particles of one metal and depositing them on the surface of another body. The nature of the solution or bath varies with the metal to be plated and the kind of plating material to be used. The deposit thus formed is so close, the adaptation of the one metal to the surface of the other so perfect, that the two substances are practically made one, and mechanical force is hardly sufficient to separate them. A cavity filled by such a deposit would therefore be nothing short of perfection. Every irregularity of the surface walls would be absolutely and thoroughly filled. The microscopical particles of the filling-material would even penetrate and hermetically seal the interstitial openings adjacent to and communicating with the main cavity. Adaptation would be so perfect that no undercuts would be necessary to retain the filling in position. Indeed, the writer has been able to deposit a filling on an almost flat surface sufficiently close to require considerable force to scale it off. Again, inaccessible portions of the cavity would be as perfectly filled by this method as the accessible ones. It would save labor ; also material, for in large cavities cement or amalgam could be used first, and then over this a deposit of gold could be made. Root-canals could be more perfectly filled. In short, it would prove an ideal filling in every respect. The writer has conducted his experiments thus far on teeth outside the mouth, and has obtained some most perfect and beautiful fillings. It will not be necessary here to go into detail as to the kind of solution used, strength of current employed, etc., but a short outline of a few of his experiments will be briefly noted. First, a tooth was taken and a clean cavity formed. Then with a solution of a metallic dust and some volatile fluid, such as chloroform or ether, with gold or copper paint the walls of the cavity. This forms a metallic base on which in the bath the filling is rapidly built up. For experimental purposes the liquid bronzing fluid answers all purposes. Or the cavity may be lined with sandarac, and the powder dusted over it. Almost any metal will act as a base. If another filling exists in the tooth, it may be protected from the deposit by a coat of sandarac, or some other non-conductor. The deposit will only occur where the coating of metallic dust has been placed. If only a surface to the filling is desired, and if amalgam is used, fill as usual, and after hardening clean the surface of the filling and paint the edges of the cavity with the metallic solution, and subject to the bath and current. The amalgam will act as a conductor, and take on a good plating. If cement is used, fill and dust the surface before the cement sets, and afterward proceed as in the amalgam.

To procure a filling in this manner outside the mouth is an easy matter. Now with the teeth *in situ* there are a few difficulties to be overcome, but it is the opinion of the writer that they are not insurmountable.

First. "To obtain an appliance to insulate the tooth to be filled, in a water-tight bag or cup." It is possible to do this by means of a rubber cup or tube fitted closely around the neck of the tooth. The opening to this tube may be outside the oral cavity. In order to watch the progress of the filling, a section of the tube may be of glass. In upper teeth the tube may be bent siphon-like, with the opening kept higher than the tooth. It would thus retain liquid. This would not be necessary in the lower teeth.

Second. "The fluid used may be detrimental to the tooth-structure or poisonous to the patient." Both objections hold good in some cases, but for filling with gold, silver, tin, or nickel, a harmless fluid is obtainable.

Third. "It would take too long." A filling may be inserted in this way quicker than the average operator could do the work.

Fourth. "The current might be painful to the patient." The current sufficient to deposit such a filling is not perceptible even when passed entirely through the jaw.

Fifth. "Could a current be induced through bone-substance?" Very easily if moist. A small copper wire brought in contact with any portion of the tooth, or even by means of a damp sponge applied to the face over the tooth, would form a sufficient conductor.

Sixth. "Could the filling-material be prepared in a convenient form?" The pure metal is all that would be necessary, prepared in strips or pencils to which one of the poles could be attached.

There may be other objections urged, but none seem insurmountable. The advantages over the present mode of filling are many, and it is the firm belief of the writer that in this way we may produce a truly ideal filling.

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PROCEEDINGS OF SOCIETIES.

WISTAR BIOLOGICAL ASSOCIATION.

At a regular meeting of the Wistar Biological Association, held at the Wistar Institute of Anatomy, University of Pennsylvania, October 2, 1894, Professor W. D. Miller, of the University of Berlin, delivered a lecture on "The Bacterio-Pathology of the Human Mouth, and Its Significance in Relation to Systemic Diseases."

Dr. Horace Jayne, in the absence of the president, said, in introducing the speaker, that he was one of the first graduates from the Dental Department of the University of Pennsylvania, having been a member of the class of 1879; then going abroad, he had entered upon a series of wonderful investigations in dental bacteriology, which ranked in relation to dental bacteriology as do those of Koch and Pasteur to general bacteriology. Professor Miller needed no introduction, but, following the established custom, he made these few words of explanation, as he felt they would be of interest to the meeting.

Dr. Miller then said,—

Mr. President, Ladies and Gentlemen:

I have occupied myself now some fifteen years with the study of micro-organisms of the human mouth, with particular reference to the disturbances which they produce in the mouth and neighboring parts, as well as to their relation to diseases of the more remote parts of the body.

The results of my investigations have been made known from time to time through various publications, and are no doubt familiar to many of the practitioners and students of dentistry here present. I am convinced, however, that this is a subject which is of quite as much importance to the medical practitioner as it is to the dentist, and I am glad of the opportunity to present a few facts relating to it before an audience composed chiefly of practitioners of medicine, although in the short time at my disposal I shall not be able to present more than a mere outline.

The knowledge that the human saliva often contains something which exerts a toxic effect upon the animal as well as the human body is by no means of recent origin.

Many of the ancient writers call attention to this fact, among others the celebrated Galen, who himself was eye-witness to the operation of killing a scorpion by the action of human saliva, "without the aid of magic." And, further, Aristotle was acquainted with a girl whose bite was as poisonous as that of the most venomous snake. An arrow dipped in her saliva invariably killed anything which was wounded by it. We can readily understand this now, since we know that the bite of a human being is a very serious matter, and I, personally, would prefer at any time to be bitten by a dog (unless it was suffering from hydrophobia) rather than by a human being. Even the scratch of an instrument infected by usage in an unclean mouth has been known to be fatal, and the case reported by Aristotle can be believed most readily.

Pliny relates, also, that the human saliva is poisonous, and that a snake will flee from human saliva as from boiling water, and that saliva dropped into the mouth of a snake will kill it. In all these years since Pliny no one has taken the trouble to test the accuracy of this statement, although it would be a comparatively simple matter to do so.

In recent times (1834), Eberle refers to the fact that the human saliva contains poisonous elements, and, according to his idea, its toxic properties depend on the state of the mind at the time being. He found his own saliva to be more poisonous when he was enraged or suffering pain than at other times. He would subject himself to irritating influences in order to become enraged artificially, and noticed that the toxic action was increased thereby. Later on many observations were reported, all tending to definitely establish the fact that when smaller animals, as rabbits and mice, are vaccinated with saliva, they almost invariably die inside of twenty-four or thirty-six hours.

It was believed for a time that the toxic agent was the sulfocyanid of potassium. However, it was shown by others that the amount of this salt in the saliva is too small to have any influence on the human being; while, in 1881, Pasteur and a score of other observers established the fact that the poisonous character of the saliva is due to the presence of a group of micro-organisms, which have been designated as the micrococci of sputum septicæmia.

Since 1881 a great many have occupied themselves with investigations relating to this subject, and have met with no less than thirty-two different species of micro-organisms of a pathogenic character in the human mouth, some of them having most virulent properties, besides large numbers of organisms which are not pathogenic.

One of the most common results of bacteritic action in the human mouth is caries of the teeth. We have not the time to enter into a discussion of this process; the photo-micrographs which I shall demonstrate can scarcely leave any question in your minds as to the nature of the process.

A second result is the inflammation of the pulp of the tooth (pulpitis), one of the most common causes of toothache. It is a great mistake to look upon pulpitis as a disease of a very trivial nature, because apart from the intense suffering caused by it, and apart from the possible, or often probable, loss of the tooth, it not infrequently incapacitates the patient for the time being for any kind of labor; and when it occurs, as is too often the case, in connection with other disturbances,—during gravidity, confinement, or protracted illness,—it becomes a disturbing factor of no mean order.

The inflammation of the dental pulp, if left to itself, will almost invariably be followed by suppuration, and eventually by the death of the organ. Putrefaction then sets in, and the pulp soon becomes converted into a putrid, stinking mass, which contains substances (ptomaïnes) of an exceedingly toxic nature.

If but a minute portion of such a pulp is forced through the apical foramen, it almost invariably gives rise to intense inflammation of the pericementum or lining membrane of the root. The tooth becomes intensely sore; considerable œdema sets in; swelling of the cheek and lips, and frequently general symptoms, such as fever and chills, are present, which indicate that a certain amount of the poisonous product has been taken into the system. Usually the inflammation ends in the formation of an abscess, and the pus escapes through the external lamella of the alveolar process into the mouth.

Occasionally it finds its way into the antrum or nasal cavity, or escapes externally at the angle of the jaw, under the chin, on the breast, in the arm-pit, etc. After the discharge of the pus the process usually assumes a chronic character, and may give rise to no marked symptoms for years, more or less pus, however, escaping constantly or at intervals through the fistulous opening.

These alveolar abscesses are by no means infrequently the cause of secondary complications of a most serious nature; periostitis, osteomyelitis, caries and necrosis of the bones being some of the most common results of infections originating in gangrenous or putrid tooth-pulps. Koehler, director of the Charité Hospital in Berlin, observed no less than forty-four cases of this nature in two years. Many cases have been reported in which these processes have terminated fatally through the intervention of septicæmia or meningitis, less frequently through glottis œdema, pneumonia, etc.

A few cases may serve to give an idea of the varied course which the process may take:

1. Child, age four and a half years. Carious teeth in lower jaw. Suppuration in inferior dental canal, periostitis, ostitis of the vault of skull, general pyæmia. Death in nine days.

2. Workman, age thirty-six years. Abscessed teeth, lower jaw. Osteomyelitis, phlegmon, periostitis purulenta, mediastinitis, pleuritis, pericarditis. Death twenty-four hours after appearance of phlegmon.

3. Boy, age eight years. Abscess of right inferior first molar.

Suppuration, œdema, necrosis, gangrene, sepsis. Death in twelve days.

4. Boy, age nine years. Abscessed teeth in right lower jaw. Periostitis purulenta, necrosis of entire side of jaw, sepsis. Death.

5. Man, age forty-eight years. Abscessed incisors, lower jaw. Osteomyelitis, necrosis, laryngitis. Death.

6. Woman, age twenty-six years. Abscess of right inferior first molar. Osteomyelitis, necrosis of condyloid process.

7. Girl, age fifteen years. Abscess of right inferior molar. Ostitis and periostitis mandibulæ dext., endocarditis, pleuritis, nephritis, broncho-pneumonia. Death in four and a half months.

8. ——. Diseased tooth in upper jaw. Inflammation of antrum, caries of the ethmoid, abscess of orbit, arachnitis, encephalitis. Death.

The above cases are sufficient to show *some* of the complications arising from diseased teeth. A long list of such cases will be found in the second German edition of "Mikroörganismen der Mundhöhle," as well as in the DENTAL COSMOS for 1891, p. 706.

A further complication of abscessed teeth which gives much food for thought is illustrated by the following case: Patient, a sickly boy, nine years of age, suffering from a large abscess of the right inferior first molar, accompanied by periostitis. On attempting to get up he fell from his bed, slightly bruising his thigh. The bruise became the seat of a secondary abscess, the pus of which had the same character and contained the same micro-organisms as that discharged by the abscess of the tooth. A large number of similar cases have been reported; cases of acute or chronic pyæmia in which abscesses in various parts of the body have been caused by diseased teeth, and Baker relates a case where an abscess on the big toe was cured by the treatment of a suppurating molar. These cases are easily accounted for. From the abscess of the tooth not only are toxic substances constantly being absorbed, but also pathogenic bacteria from time to time find their way into the circulation to be redeposited again, and to proliferate anew wherever, at the time being, they may find a locus minoris resistentiæ, —point of diminished resistance. While therefore a focus of chronic suppuration in the jaw may apparently produce no evil beyond the local symptoms, we never can tell but that it may be preparing or keeping up some process in some remote part of the body. Fürbringer puts it very well when he makes the assertion that many of those obscure cases which we are obliged to book as "unknown mycoses" will undoubtedly be traced to their origin when we come to properly appreciate the importance of a thorough understanding of the human mouth as a focus of infection.

Let me call your attention, in the next place, to a condition very commonly met with among the lower classes, and indeed often enough among well-to-do people, which might be designated as total decay of the teeth. We find nearly every tooth in the mouth more or less decayed, many of them completely broken down, with exposed pulps or abscessed roots, and swollen, suppurating gums. Masticating food is entirely out of the question, while quantities of pus and bacteria are swallowed with every meal, a condition of affairs to which an attack of measles or scarlet fever were, in my opinion, decidedly preferable. The recent examinations of the teeth of school-children have made some startling revelations in this line. Then, again, we often have in the mouths of uncleanly persons a condition brought about by the action of fermenting and putrefying matter upon the mucous membrane which I have likened to a "spoiled stomach," and designate as spoiled mouth. As early as 1656 Pfaff called attention to the fact that loss of appetite, nausea, etc., are often erroneously attributed to the innocent stomach, when the cause was to be found in the filthy condition of the mouth. Von Kaczorowski has furnished us with very interesting data in support of this view.

The causal relation of diseased teeth, particularly of teeth with putrescent pulps, to chronic swelling of the lymphatic glands in the region of the lower jaw and neck has been clearly established by Odenthal, who found glandular swellings in ninety-nine per cent. of all children who suffered from badly-decayed teeth, and only in forty-nine per cent. of those with sound teeth.

A further condition in which bacteritic processes are involved is that known as pyorrhea alveolaris, in which more or less profuse suppuration takes place about the necks or roots of the tooth, involving the bony socket. The teeth gradually loosen and eventually fall out. Apart from the loss of the teeth, the constant swallowing of the pus from such teeth is not to be regarded as a matter of indifference. *On n'absorbe pas impunément pendant des mois et des années, des sécrétions purulentes contenant des agents aussi infectieux que ceux de la pyorrhée alvéolaire.* (Galippe.)

The question of pyorrhea alveolaris has excited unusual interest recently on account of its supposed connection with the uric-acid diathesis. It remains for the future to definitely determine in how far this affection actually depends upon a uric-acid diathesis for its origin.

The tonsils have already received a great deal of attention as harbingers of pathogenic germs. It is a fact generally recognized that various pathogenic germs, among others even the bacillus of diphtheria and the ray fungus (Actinomyces), may vegetate in the lacunæ of the tonsils without producing any serious symptoms as long as the general health of the person is good, and no lesion or other point of diminished resistance is formed in the tonsils or mucous membrane of the throat. Otherwise an infection is liable to occur at any time. The literature of this subject is already very extensive and exceedingly instructive, but we have not the time to enter into a further discussion of it.

Another disease of the mouth of parasitic origin is *thrush.* You are all acquainted with its nature and treatment. I will merely state that this is the only disease of the mouth, and in fact of the human body, which is caused by a yeast fungus. The view formerly held, and still commonly met with in medical journals, that we have here to do with a mold fungus, has been shown to be untenable.

It is well known that the prolonged administration of mercury or its compounds brings about an affection known as stomatitis mercurialis, the symptoms of which are familiar to you all. Very careful and reliable observations by Galippe, which have been confirmed by Ritter, leave little doubt that these symptoms are in a great measure due to the action of bacteria upon tissue which had been rendered more susceptible to them by the influence of the mercury. If the mouth is put in a perfect hygienic condition, as it always should be before the mercurial treatment is begun, much of the trouble arising from this source will be avoided.

Actinomycosis is still another bacteritic affection, very often terminating fatally, in which the point of entrance is usually to be found in the mouth. Out of two hundred and twenty-five cases, one hundred and twenty-eight were found to have originated in the jaws, defective teeth most commonly furnishing the locus minoris resistentiæ. Of the remaining one hundred cases many were primary infections of the lungs and alimentary tract, in which, again, the germs entered the body through the mouth.

The relation of mouth-germs to affections of the middle ear (otitis media) merits particular attention. Fifty-four cases have been reported by Maggiore and Gradenigo in which they found the micrococcus of sputum septicæmia twenty-eight times, staphylococcus pyogenes albus eight times, s. p. flavus five times, and streptococcus pyogenes eight times; all of these being micro-organisms very commonly met with in the mouth.

They found, moreover, in eighty per cent. of the cases examined, the same germs in the secretions of the mouth and nose as in those of the middle ear. According to Zanfal, the micro-organisms find their way into the middle ear through the tuba Eustachii.

Inflammation of the salivary glands has been shown by various observers to be frequently brought about in a similar manner; bacteria penetrating from the mouth through the ducts of those glands.

It has been established beyond all doubt that the specific cause of croupous pneumonia lies in a micro-organism or group of micro-organisms which can readily be found in the mouths of the majority of all persons. It is the same group that was referred to in the beginning of these remarks as the chief cause of the toxic action of human saliva, variously designated as micrococcus of sputum septicæmia, pneumococcus, meningococcus (from its frequent causal connection with meningitis), etc. Many experiments and observations have been reported which render it highly probable that the infection in case of pneumonia does not take place directly from the air, because the specific micro-organisms soon lose their virulence or even vitality in the air. Furthermore, it has been pretty well established that in breathing in air which contains moderate numbers of micro-organisms, the latter lodge in the mouth, nose, and throat, and do not reach the lungs in sufficient number to be able to bring about an infection. It is much more probable that the infection takes place directly from the mouth by particles of saliva or mucus loaded with germs being carried into the lungs in forced inspiration, as in coughing. Whether this act would be followed by the development of croupous pneumonia or not would of course depend upon the susceptibility of the lungs or any point of them at the time being. This same group of micro-organisms has furthermore been met with in parotitis, multiple subcutaneous abscesses, tonsillitis, otitis media, pleuritis, endometritis, peritonitis, peri- and endocarditis, abscesses of the mastoid process, and retropharyngeal abscesses, meningitis, etc.

I find that I have already overrun the time set apart for these few introductory remarks; I shall therefore only mention some of the other affections which would demand consideration in this connection, such as stomatitis gangrenosa and aphthosa, stomatomycosis, foot and mouth disease, and, in particular, those general diseases which originate in the mouth, or at least produce marked local manifestations there, such as syphilis, tuberculosis, diphtheria, influenza, etc., in all of which the thorough and intelligent care of the mouth is imperative in the highest degree.

The above, which is only a mere outline of the subject, may suffice to show you what an extensive influence the condition of the mouth exerts in determining the general state of health of the whole body, and how imperative it is that every one practicing medicine or any branch of it should be thoroughly informed in regard to this question. It furthermore, in my opinion, justifies the statement that stomatology, or that branch of medical science which has to do with the diseases of the human mouth and their treatment, is perfectly entitled to stand on an equal level with the other specialties of medicine: otology, ophthalmology, etc.

A demonstration was then made by means of photo-micrographs projected upon the screen by the lantern, showing in detail the morphology of the several groups of pathogenic bacteria which inhabit the human mouth.

A full set of slides, illustrative of the author's investigations upon the etiology of dental caries, was exhibited, showing bacteria *in situ* in normal caries, and also in that artificially produced by subjecting sound dentine to the action of pure cultures of the specific microorganisms concerned in the production of the disease.

A most interesting slide was one taken from a section of the kidney of a mouse which had been inoculated with the thrush fungus. The section showed the bacterium *in situ* with inflammatory action set up by its presence, thus demonstrating conclusively the power possessed by the thrush fungus of instituting metastatic inflammatory processes.

The remainder of the demonstration consisted of an exhibit of mouth bacteria which have been described in detail by the author in his several contributions to the DENTAL COSMOS and embodied in his work, "Die Mikroörganismen der Mundhöhle."

NEW JERSEY STATE DENTAL SOCIETY.

(Continued from page 891.)

FIRST DAY—*Evening Session.*

A PAPER by Dr. L. P. Haskell, of Chicago, entitled "Fifty Years in the Dental Laboratory as I Have Seen It," was read by Dr. F. C. Barlow. The paper, as its title indicates, was largely a historical *résumé*, from a personal standpoint, of the changes and progress which have taken place in prosthetic methods and procedures during the past half-century. While of interest as a part of the society proceedings, the essential facts set forth are matters of historical record, and for this reason do not warrant republication here. There was no discussion.

A paper was then read by Dr. F. R. Callahan, of Cincinnati, Ohio, on the subject, "Sulfuric Acid for Opening Root-Canals."*

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* For Dr. Callahan's paper see page 957 of this number.

Discussion.

Dr. F. T. Van Woert, Brooklyn, N. Y. In accordance with the usual custom, I shall begin by declaring my pleasure at having heard so able a paper. In many cases this is a matter of form, and compliment to the author, but in this case I feel all that my language implies. The writer has given us something that we may all take home and put to practical use. The profession through the entire world realize the advantage it would be to thoroughly cleanse all roots to the foramen and perfectly fill them, but they know that it is an utter impossibility, notwithstanding the declaration of one gentleman that he always does it. We do not believe it. I say we, because I am confident there is not a member here who would place himself on record as believing that the man lives who can accomplish such miracles. Since reading one of Dr. Callahan's articles on the subject under consideration, I have made use of the sulfuric acid in several difficult cases, with very great satisfaction, and I am of the opinion that this method is the nearest to a solution of our difficulties in that direction of anything ever presented, and it seems to me a series of investigations on that line should be made. In talking with several gentlemen on the subject, I find that sulfuric acid has been used a number of years, by two or three, for opening obscure root-canals. While their method varied from that described by Dr. Callahan, yet the principle is the same. They report the best results, and would, if here, recommend its general use, I am sure.

I have only one fault to find with the paper : that is, there is nothing in it for me to discuss. The essayist has covered all the ground from my point of view. I can't find anything to take exception to, being a thorough convert to his method. I have accepted it as the true practice, which I shall follow from this time forth, or until something better comes to take its place. I think the most of you will see its practicability and do likewise.

As to the filling of these roots after they are prepared, the most of you know my theory concerning this. I believe roots should be filled with a material which does not change after placing, and which can be put in position with some degree of certainty, and I know of no physical or mechanical law that would warrant us in attempting to insert gold in minute particles to the apex in one of those roots with more crooks in it than a Pennsylvania coal-mine, even if it were possible to get there. He who says that he can do so with certainty is to be pitied, for he is certainly a deluded man, who stands alone and unsupported.

Dr. Callahan has presented a practical and scientific method for conquering many cases which would otherwise be hopeless ; to him belongs the credit of introducing scientific root-preparation, and the publication of his contribution will not cause us to hang our heads with shame, as two or three burlesques of the past have.

Dr. L. C. Leroy. Mr. President, may I ask Dr. Callahan what the effect of sulfuric acid is upon living tissues, when it goes through into a blind abscess, as we term it?

Dr. Callahan. It breaks down diseased tissue, leaving a fresh aseptic surface. It leaves the surfaces of the tissues somewhat in the condition that cautery would leave an ulcer to which you had applied it.

Dr. Leroy. If we should make an introduction of sulfuric acid in a blind abscess, there being no fistulous opening, and subsequently inject bicarbonate of soda, we get a chemical action which, I should judge, would create a disturbance. Is there some inflammation created by injecting bicarbonate of soda?

Dr. Callahan. No, sir.

Dr. Leroy. No pain to the patient?

Dr. Callahan. No. There is sensation. The patient will sometimes notify you when chloroform goes through the apical foramen, and in this case there is something of that nature resulting, nothing further.

Dr. William H. Trueman, Philadelphia, Pa. Mr. President, I question if there is within the whole domain of dental science any operation in which the "personal equation" plays a more important part than it does in the treatment of exposed pulps and the treatment and filling of pulp-canals. We may study, as set forth in the dental periodicals, the history of pulp-treatment from the time it first began to assume a scientific basis to the present hour, and I venture to say that the various suggested methods of treatment, no matter how diametrically they may differ upon vital and essential points, all have this in common—the results are invariably the desired success.

I remember, some years ago, hearing a gentleman whom you all know give his experience of pulp-treatment, in which he stated that whenever he could, by any means, have the pulp-canal filled with blood at the time he inserted the filling, he never had any trouble at all; and if he could not get blood there, then he considered the operation very uncertain, and sooner or later expected abscess. The gentleman was no ignoramus; he was not talking for effect; he was giving his sober convictions, based upon fifteen or twenty years' experience, and I have no doubt that he practiced what he preached. When he said he was successful, I believe he was. I have since seen sufficient of his work to think so. At the present time, it is urged that we must get everything perfectly clean, surgically clean, and absolutely dry; indeed, some writers are not satisfied with thoroughly cleaning the pulp-canal, but they would have us ream out, clean, scrape, disinfect, render aseptic, and thoroughly fill all the dentinal tubules. Between these extremes we have an endless variety of methods from which to choose.

I read with much interest, a short time ago, in one of the dental journals, an article written by the essayist, in which the same ideas he has expressed in this paper were set forth. His use of this agent for this purpose is somewhat original, and the essay presents to us a real addition to our stock of knowledge; it is something to remember, and will, no doubt, at times prove of practical value.

From time to time various agents have been introduced to facilitate the removal of the contents of the pulp-canals. A few years ago a preparation of pepsin, to which, immediately before use, was added a portion of hydrochloric acid, was highly recommended. It was suggested that the contents of the pulp-canals would be digested and rendered soluble by the acidulated pepsin, so that with a syringe and warm water they could be washed out perfectly clean. I used that for a little while and thought it very satisfactory, but it proved to have a limited usefulness only, and finally my bottle of dental pepsin found its way into the ash-barrel. I presume that the experience of others was much the same as my own. We now hear nothing of it, and I question whether dental pepsin is now on the market. It is well to know and to remember these various expedients. While we may hesitate to at once adopt them, that is not necessarily an expression of disapproval. There are times and cases where one or the other may prove especially useful.

With reference to the use of bicarbonate of soda after the sulfuric acid, and the formation of carbonic acid gas causing the expulsion of the contents of the pulp-canals, the thought has occurred to me whether, as the gas is given off so quickly, would it not sometimes work both ways and drive some of the contents of the canals through the foramen, and thus cause mischief?

Another point. Ever since the time, some thirty years ago, when Professor James Truman demonstrated to me under the microscope the minute anatomy of the teeth, it has been a question with me whether the trouble which causes alveolar abscess, etc., is always within the tooth. That it frequently is we admit, but is it always due to an irritant within the pulp-canal? Can this possibility in all cases, by perfect work in removing the pulp, perfectly cleansing and filling the pulp-canals, be positively eliminated? May not the cause of alveolar abscess be, in some cases, *without* and not *within* the tooth? May it not be in some cases primarily due to disturbed nutrition, resulting simply from the absence of the pulp and quite independent of any pathological conditions of that organ, or which may exist in the space it once occupied?

The idea now held by most writers upon pulp-treatment seems to be that if the pulp-cavity and pulp-canals can be got absolutely and surgically clean, and then filled with something that will remain clean, the possibility of future trouble is entirely dissipated. Is that true? I question it. About a year ago last Christmas, a gentleman, whom I well knew, was taken with pneumonia. He was an elderly man, and he had a severe time. He gradually recovered, the disease seemed to be conquered, and in a few days he expected to be able to get out of bed and go about his room. About that time a numbness developed in one of his lower limbs, indicating that a not infrequent sequel of pneumonia, embolism, was seriously impairing the nutrition of that member, and gangrene followed. His limb was amputated. It was done skillfully, but he died from the shock. Now, may it not be, in our practice, that when a pulp is devitalized and the nutrition of the tooth necessarily to some extent thereby impaired, that this loss of nutrition, perhaps not immediately but eventually, may cause devitalization of pericemental tissue around or adjacent to the apex of the root? I do not mean by the destructive agent passing through and producing the same effect outside the tooth that it was intended to do inside, but simply by depriving that portion of the surrounding tissues of their normal nutrition, in much the same way that the gentleman's lower limb was deprived of its normal nutrition.

If this theory be true, it may explain some very strange things met with in practice; it may explain why a tooth that has been treated may remain perfectly comfortable for five, or ten, or even twenty years, and then give trouble; it may explain why we may have an abscess with a fistulous opening, that we cannot reach through the pulp-canal.

I am firmly impressed, and have long so been, that where a tooth is deprived of its pulp, no matter how skillful the treatment, it is liable to give trouble at any time,—not so much because it has not been skillfully treated, but simply from causes over which we have no control, and which we cannot reach. Of course the acceptation of this idea does not in any degree take from us the responsibility to do the best we can. We know that if the pulp-cavity be not thoroughly cleansed there is a greater possibility of trouble, therefore we should use our best efforts and all means in our power to put the tooth in the best possible condition.

Dr. E. A. Bogue, New York. Mr. President and gentlemen, I was exceedingly pleased to hear this paper, and more than pleased to hear it from the author. Having read his views on the same question, not so very long ago, I, on one occasion, tried the treatment. It seemed to me that he presented a means, both practical and scientific, of getting out from, we will say, a lower molar root the *débris* of a dead pulp. I want to ask the essayist to tell us whether his paper had reference to the treatment of teeth in which the pulp has been recently destroyed, or to the treatment of teeth in which the pulp has died of its own accord, or spontaneously without abscess, or, again, whether it has reference to the treatment of teeth with fistulæ. I understood that he referred to two of those classes, and not to the third. As I understand the conditions, we have those three kinds of cases constantly coming before us to treat, and it would be interesting and valuable to us to discriminate in relation to them.

Dr. Callahan. I adopt this method wherever the pulp is dead, whatever may be the cause, and whatever the time. I think it applies as well to teeth in which the pulp has been destroyed recently, or has been dead a long time, as in cases which have blind abscess or open abscess. My way of doing it is to open the root-canal thoroughly, from one end to the other, and place it in a thoroughly aseptic condition. The acid may go through the foramen ; I would rather it would if there is abscess, and if there is a fistulous opening. The treatment is applicable wherever the pulp is dead. I believe in this treatment, provided the root is small, and difficult to treat in any other way, but I have no objection to anybody adopting this method for all canals. I think it would be better, perhaps, than some others.

Dr. Bogue. Dr. Callahan has the idea, I suppose, that an abscess is invariably accompanied by the presence of germs, and that sulfuric acid would be destructive to them.

Dr. Callahan. That is the idea.

Dr. Jackson. I would like to ask Dr. Callahan if he has found that the acid penetrates the sides of the roots and produces periostitis, inflammation of the peridental membrane, before the acid has reached the end of the root, or before a free opening has been made to the end of the root.

Dr. Callahan. I don't know how to answer that question. The operation is usually made in a very few minutes, so there is no opportunity for inflammation to develop that would make any trouble. I dislike very much to make any declaration as to the value of a remedy, or how many cases have been successful and how many have been unsuccessful. I have tried to avoid that point altogether. I don't think it sounds well, especially if one happens to be a little enthusiastic on the subject. But I may say that I have no recollection of having had trouble with a root when I have been successful in getting the acid through it, except in one case, that of a lady who had had an abscess on various occasions for six or seven years, —a chronic case. In that case I opened the root-canal, treated and filled it at the same sitting. The next day her face was swollen somewhat, and the tooth was sore. The swelling and the pain subsided in about two days, and since then has given no trouble. I have quite a number of cases recorded, running into the hundreds ; and three of my friends in the State of Ohio are keeping records of cases, so that at the next meeting of our State Association we will have between five hundred and a thousand recorded cases in actual practice. We are not going at this matter carelessly, or making any careless statements.

Dr. Watkins. I want to ask Dr. Callahan whether it is his custom to fill canals at the time he treats them,—at the first sitting. He has just mentioned that he did in one case, the case which gave trouble. I would like to know whether that is his custom generally.

Dr. Callahan. Mr. President, I have tried to avoid that point. I did not say anything about that, because we say a great many things at times that don't sound well, even if we believe them. I may say that if there be no signs of inflammation, and the case has not been of long standing, and has not been threatening abscess at any time, then I fill at once ; but if the tooth is sore, or has been sore recently, or if it is in the mouth of an elderly person, or a very weak person, then I prefer to give it at least one treatment. I have said nothing about the treatment. We must be governed by circumstances. I have seen many cases in which I would not fill at the time the root-canals were opened ; but perhaps the next case that came in I would fill the root-canals at once.

Dr. Maxfield. How is the acid thrown into the pulp-cavities of teeth in the superior jaw?

Dr. Callahan. The gentleman will excuse me if I answer his question by asking him to read my first paper on this subject. In that paper I cited cases. I have a number of copies of that paper with me. The treatment is applied to the superior teeth just the same as to the inferior. There is no trouble about getting the acid into the canals. In the first paper I mentioned that I used a dental syringe for carrying the acid. I am sorry that I said that, because I don't think it is wise ; I think cotton on a broach is better. You are not so apt to get it out over the tooth and into the mouth.

Dr. C. N. Peirce, Philadelphia, Pa. Mr. President and gentlemen, I have been very much interested in the paper and the discussion following it. I think the paper was eminently conservative and scientific ; scientific because it treats of the application of remedies appropriate to the conditions. That makes a scientific paper. The gentleman has given us a very clear statement of his method of applying a remedy that is certainly most efficient. I have great sympathy for the paper for that reason. But with reference to the success of the remedy, we must remember that a number of remedies have served us well in the same way, that many of us have treated root-canals for many years with other remedies and have been quite as successful.

The application of this treatment to root-canals requires great care not to force the material through the apical end. I think that is quite essential, indeed very essential. With other antiseptic remedies we may accomplish the same result; there certainly can be no application better than an acid, and I should not hesitate to use this acid of a greater strength than fifteen per cent.

Dr. Callahan. Fifty per cent.

Dr. Peirce. I understood you to say fifteen per cent., and I was going to say that I had used a twenty per cent. solution without detriment. I think the effect, even when it goes through the end of the canal and comes in contact with the soft tissues, would only be beneficial, because there is invariably, whether the tooth has been recently devitalized or has been long devitalized, some congestion, and as an astringent an acid would be beneficial; so I have no hesitation in saying that I should highly approve of this remedy. I think it was most admirably stated in the paper, and I think the paper itself is invaluable to every practitioner and student.

A remedy suggested by Dr. Kirk is the application of sodium peroxid. He uses sodium peroxid first, and follows it up with the acid. Sodium peroxid I have no hesitation in placing in a tooth. It will make its way up in the canal and do good service. I then follow the application of sodium peroxid with the acid. I think it accomplishes the object sometimes more rapidly than the method described here, because sodium peroxid is very powerful. Then the application of the acid washes it out. Soda bicarbonate is, I think, admirable. The application can be thoroughly made with a little cotton on a broach, without a syringe. I should hesitate about using a syringe.

Dr. Callahan. Mr. President, I can assure you that I feel grateful for the kindly manner in which my paper has been received. I should like to mention one thing that is omitted in the paper; that is, that it is not safe to use one of these broaches more than one time. The acid makes them very brittle, and they are then liable to break off. You will get into trouble if you use them more than once. I have had them break off, but they are easily removed by winding a little cotton around another broach and using that.

The President. We will now listen to a blackboard chalk talk, by Dr. F. T. Van Woert, of Brooklyn.

Dr. Van Woert. Mr. President, ladies and gentlemen, I wish to present to you this evening a modification of a system that I have advocated in the past, together with the use of soft solder in crown- and bridge-work, as well as general prosthetic dentistry. I have an idea that the use of soft solder is entirely new in this direction; I have never read nor heard of its use before making the application myself.

First, I would take up that system of dovetail backing and removable faces, such as I have talked of in the past, and try to describe, if possible, an easy method of making instruments and appliances in any and every case where material, appliances, etc., are not to be had other than such as come under our hands from cast-off instruments, etc. The making of a gib and backing of uniform angle is a difficult task, if there is no standard by which you can gauge the same. To overcome this, I have devised the following scheme: By taking a flat No. 4 six-inch Grobet file, and placing it upon the bench at the angle desired, fastening with a little wax to hold in position, and then flooding or packing around it on the outer surface sufficient plaster to hold it in position and at the same time maintain the level upon the bench, the gib templet so formed may be filed up so that either side of the gib templet is of the same angle, making the backing and templet interchangeable, regardless of its position. The difficulty has been, in the past, to make a dovetail gib and backing of uniform size and angle. To overcome this I have devised two or three systems, by which any dentist who is so situated that it is difficult to obtain accessories to the furtherance of schemes of this kind, may, with the cast-off materials at his hand, overcome the difficulty after the following manner :

First, when the templet is formed as described, it is placed upon the bench ; under it is placed a piece of sheet zinc, to insure a smooth and hard surface, the small side of the dovetail down ; a piece of No. 32 gauge platinum is placed on top and held in position by screwing down upon it a piece of maple or other hard wood. If it is possible to secure an ordinary cast-iron vise, such as is generally sold for fifty cents, the same results may be obtained by filing the jaws on either side. The gib, which is made by bending platinum over a gib templet of thin platinum, is coated on the outer surface with a solution of whiting to prevent the adhesion of molten metal on the outer surface, and then filled in with such material as the operator may deem most appropriate to the case, such as eighteen-carat gold, clasp metal, or, in fact, any other that may be considered advisable. This gib, when made, serves better as a templet for making the backing than the original gib templet, made from the old excavator. In this way it is possible for any of us to make removable-face crowns or bridges, and have them interchangeable. To be sure, it would be better if we could have an instrument for universal use, and find the gibs at our dental depots, etc., but as this seems impossible at the present time, the mode which I have here described relieves us of the necessity of abandoning this mode of procedure.

Now, as regards the use of tin or common soft solder, I wish to go back several years and cite a case in practice which converted me to the adoption of this material. A patient for whom I had inserted four crowns, centrals and laterals superior, presented himself, a few weeks after the operation, with the roots, so to speak, migrating or getting out of position. I had been particularly pleased and delighted with the operation after completing it, and I may say that the patient was even more than gratified, and this change was, to say the least, very humiliating. The gentleman being a commercial traveler and having very little time at his disposal, I was compelled to improvise something as a temporary stay. Fortunately I had set the crowns with gutta-percha, which permitted of their removal, and after putting them in place again, without a setting, I took an impression with them in the mouth, made my model, filed V-shaped grooves through the gold backing, inserted a piece of copper wire, which I had previously tinned, and fastened it with common tin solder. This, of course, was to be a temporary adjustment, lasting until such time as he could give it the proper attention. This happened some seven or eight years ago, and the gentleman is wearing the fixture to-day, and will not consent to my removing it and making the adjustment with gold. This led me to think there was more use for soft solder in prosthetic dentistry than had heretofore been credited to it, and I began experimenting in various ways, the result of which is that I seldom, if ever, attach a tooth to a metal plate, crown or bridge, in any other way than with soft solder.

In making partial plates I pursue the same course that you all do, other than that I keep the pins in the tooth perfectly straight, in order that they may be removed without disturbing the backing; and, after their proper adjustment on the models, I remove them from their position, leaving the backing, which I invest with the plate, as though the tooth were in position, and solder with gold, as in the regular order ; after which I drill the holes the exact size of the pins, readjust the teeth, after having saturated or covered the pins and sockets with a solution of zinc chlorid, and attach them to the plate with a little soft solder by means of a soldering iron.

This seems to be very much less trouble, and permits of the easy repair of the case at any future time.

Now, in crown-work, where the roots are badly decayed, the main difficulty has been in getting the crown to retain its place or position for anything more than a very short period, for the reason that all of the cements or phosphates used, at the time of mixing, heat very perceptibly, the result of which is the heating of the pin, and its expansion beyond that of the phosphate, consequently a very minute crevice is left for the ingress of moisture or fluids, which generally results in a softening up of said phosphates and a loosening of the crown. Furthermore, it is a well-known mechanical law that the joining of any two substances should be by as close an adaptation of the parts as possible. The substituting of a cement or plastic does not make a positive joint. For instance, if you are going to unite two bars of iron or steel without welding, you would drill a hole into the one, of the proper diameter, and turn a tit upon the other of a corresponding size, and, if possible, have it a driving fit, after which it might be brazed, or fastened in such a manner as the case required ; but you would not attempt, in a two-inch bar, to drill a one-inch hole and insert into it a three-quarter-inch tit, expecting to fill in the space with solder or cement. Taking this into consideration, and applying the same law to the adjustment of a crown, I became convinced long ago that the dowel or pin of a crown should be made to conform as nearly as possible to the excavation in the root, and in these cases of excessive caries I have adopted the following method :

After excavating as carefully as possible, being particular to have a perfect draft, I insert a piece of copper wire or iron, whichever is most convenient, hold it in the center of the excavation, as here described, and pack around it ordinary gutta-percha, which I cool and remove, using the wire as a leverage to the core. This I invest in equal parts of plaster and marble-dust, and, after it becomes hard, remove the gutta-percha, which leaves me a mold the exact form of the root to be crowned. Now place this upon the gas stove until thoroughly dry, and heat to a temperature sufficient to fuse ordinary tin solder, filling it with the same ; then I take a Logan, or any other dowel crown, coat it, that is to say the crown itself, with sweet oil, and the pin or dowel with a solution of chlorid of zinc, heat it as hot as possible without cracking the porcelain, and insert it into the mold containing the soft solder, at the proper position and angle, and cool immediately. The result will be an adhesion of the tin to the platinum pin, and a dowel which can be inserted into the root by the use of so little cement that it would be impossible to heat it or change its diameter.

I have been using this sort of fixture or method two or three years, with more than satisfactory results.

Dr. Maxfield. Would there be any objection to the use of amalgam?

Dr. Van Woert. I never have had the success with amalgam in such roots that many members of the profession claim to have had. One thing I am certain of: it makes a distinct or separate part of the fixture, which is a serious objection, in my estimation, to its use.

Dr. Maxfield. Would you not get some shrinkage with tin or gold?

Dr. Van Woert. Yes. If there was no shrinkage there would be no room for the cement, which makes a perfect joint or union.

Speaking of amalgam, there is a class of cases in which I have resorted to the use of amalgam in combination with the How anchor screw. This has served me fairly well, but I am free to confess that I give the tin solder the preference in all cases.

Another method of making pins or dowels to exactly fit the prepared roots is to take a piece of pine or orange wood and whittle it as near the shape as possible, and drive it into place with the gold plugging mallet; then remove the same and wrap around it a thin ribbon of platinum, insert it into the root and give it two or three taps to make it conform exactly to the shape of the stick, then remove both from the tooth, and remove the stick from the platinum, which leaves a core that may be filled in with any hard material, such as clasp metal, eighteen-carat gold, copper, or whatever you choose, being careful to protect the outer surface with a solution of whiting as described before. This gives a dowel or pin which exactly fits the root, and upon which you can build any sort of crown you choose or deem best for the case.

I want to present to you a case in practice which is of very marked interest to me, and I think may possibly prove of service to you. Some two years ago Dr. Pitts, of Brooklyn, who has since died, brought a lady to me with the inferior left first permanent molar so badly decayed that the roots were separated; the posterior root being pushed out of position, and the anterior root having dropped back over a sixteenth of an inch from its normal position. He wanted to know what, if anything, could be done to fill the gap, without the use of a plate. I was very much at sea as to the possibility of serving the lady in any way; in fact, I dismissed her with a promise to send for her again in a few days if I could devise some scheme to overcome the difficulty. The following is what I finally placed in the mouth: I extracted the posterior root, made a band to fit the anterior root, placed upon it one of the White's solid cast tips, and filled in around it with twenty-two-carat solder, adjusting a spur or bar to go into the second molar, which had a large amalgam filling in it. The result was satisfactory both to the patient and myself, and she is wearing it to-day with as much comfort and service as any tooth she has in her head.

Dr. Maxfield. Is that soldered to the crown?

Dr. Van Woert. It is soldered to the band which surrounds the anterior root of the first permanent molar.

Dr. Maxfield. There is no pin in that?

Dr. Van Woert. No. It is fitted to the root, and cemented in the same way that an ordinary gold crown would be adjusted.

Dr. Leroy. Do you cement that band in place?

Dr. Van Woert. Yes. Just the same as I would an ordinary crown.

Dr. Leroy. Is there not a possibility of motion, and disintegration of the cement at the end of the root?

Dr. Van Woert. No more than there is in the use of an all-gold crown. The impression seems to prevail that there is not enough stability to the band around this root to support the grinding-surface of a molar tooth; but I assure you, gentlemen, that with the occlusion of the molars and the adjustment as described, this fixture will stand as much as a gold crown on a full or perfect root.

Dr. Leroy. That may be, but sometimes we know there is movement there, and we may fail. In time the masticating motion will create a looseness of the piece, even with gold filling or amalgam. The individual motion of the two together, or the roots of each tooth, would possibly create a looseness of the crown or of the band, because of the attachment to the molar tooth.

Dr. Van Woert. I am thoroughly satisfied, and I was warned years ago by Dr. Parmly Brown, that it was not possible to prevent the movement of the bar anchored into a filling, and I have yet to see the case where a bar is anchored into a tooth, with either gold or amalgam filling, that movement or space cannot be detected in a short time. If the surfaces of the tooth-structure are protected by the filling-material, there is no possibility of disaster coming from such conditions.

Subject passed.

Adjourned to Thursday morning, July 19, at 10 o'clock.

(To be continued.)

UNION CONVENTION IN BUFFALO.

THE twenty-sixth union dental convention of the Sixth, Seventh, and Eighth District Dental Societies of the State of New York was held in the Hotel Genesee, Buffalo, N. Y., Tuesday and Wednesday, October 30 and 31, 1894. The committee of arrangements, instead of the banquet with which the meetings have usually ended, arranged a theater party for Wednesday evening, which was attended by a majority of those who were present at the convention, and was generally considered an acceptable variation from the usual banquet.

The convention as a whole was a decided success; the attendance being large, and the interest of those in attendance closely held through all the meetings. Before adjournment an invitation was accepted to hold the next annual meeting with the Sixth District Society, at a time and place to be announced later.

The convention was called to order Tuesday, October 30, at 2 P.M.; Dr. W. V. Grove, president of the Eighth District Society, in the chair. After reading the minutes of the last annual meeting, and the transaction of other routine business, the following paper was read by Dr. M. L. Fay, Buffalo, N. Y.:

PREPARATION OF THE MOUTH—WHAT TO EXTRACT, WHAT TO LEAVE; MATERIALS—WHEN AND HOW TO USE; GETTING THE MODEL.

That there is no branch of dentistry more important than the mechanical we all concede, but that there is none more neglected and perverted we must all acknowledge. Because mechanical work may be distasteful and disagreeable is no reason why it should be slighted, nor will it be by the conscientious dentist. Success can only be gained by combining skill with painstaking care and perseverance, and if we are unwilling to give time and thought to this department far better leave it alone than to impose our carelessness upon our unsuspecting patients.

Mechanical dentistry is a broad subject and worthy our most serious consideration, but the brief time allotted will permit but the merest outline of some of the methods employed which have given me the best satisfaction in my work. The first requisite is a thorough examination of the mouth to ascertain its condition, whether any teeth remain, and if so their form, position, and condition. The shape of the arch, whether it is regular or irregular, high or flat. The condition of the membrane, state of the gums, material required for the impression, and the kind of appliance which can best be worn. Next, all tartar should be removed, carious teeth filled, diseased roots extracted, and the mouth put in a healthy condition. Regarding which teeth to extract and which to leave, each case must be a law unto itself; suffice it to say, every tooth that can be used advantageously should be saved, since one natural tooth is worth a half-dozen artificial ones for actual service.

The mouth is now ready for the impression, and to my mind the impression in the construction of an artificial denture is the most important part of the operation; for without a good impression, however much skill one may possess, good results cannot be gained.

There are four staple materials in use for taking impressions: plaster, beeswax, gutta-percha, and modelling compound. Now and then we find a dentist who uses but one substance for all kinds of impressions. This is wrong, for each has its place, and we cannot afford to discard any one of them. Plaster, modelling compound, and beeswax are the three most used, yet gutta-percha has its place and can be used with great advantage in some impressions of the lower jaw. Plaster is the material most commonly used of all. A full impression, either upper or lower, when the mouth is uniformly hard, can be best taken with this substance. The method of procedure is to select a tray one-eighth to one-fourth of an inch larger than the arch, take a piece of sheet wax about one-half inch wide, and build up the sides and ends of the cup, then warm the wax and place in the mouth. The wax being soft, readily conforms to the sides and palate, thus giving on removal a properly-formed cup. If it is a high arch it may be built up in the center with wax instead of using so much plaster. The wax rim acts as a guide as well as to keep the plaster within its proper limit; thus an impression may be made of the required height all around. The cup ready, mix the plaster, one part lukewarm water with a small quantity of sulfate of potash previously dissolved in it, to two parts plaster, slowly adding the plaster to the water and allowing it to soak well before stirring, stir thoroughly and jar the bowl on the bench to remove the air-bubbles.

Fill the cup, and insert in the mouth, putting the posterior end up first. If the arch be high, first put a little in the roof of the mouth with a spatula or the finger. The cup in position, raise the lip all around to allow the air to escape and the plaster to go in place. Then gently press on the lip and cheek from the outside, and hold the cup in the center by the middle finger. Should the mouth be hypersensitive, use a four per cent. solution of cocain as a spray. Brandy and camphor-water are also effective when used as a gargle. Have the patient tip the head a little forward and breathe through the nose. Do not remove until the plaster breaks in sharp and well-defined lines; also care must be taken not to keep it in too long, as the plaster absorbs the moisture from the membrane, and causes it to stick. This, however, can be easily remedied by injecting a little water under the lip, or asking the patient to cough slightly. But the simple raising of the lip is generally sufficient. After removing, allow the impression to dry before varnishing.

Plaster for impressions should be kept in a dry and tight box, so that it will not absorb the moisture from the atmosphere, as this retards its setting qualities. Plaster for models may be mixed in the same proportions and way, only nothing is required to hasten the setting; but it should be allowed to stand over night before vulcanizing upon it. In pouring a model, put the plaster on the palatal portion of the impression, and allow it to run down into the indentations, which will prevent inclusion of air-bubbles, especially in partial cases. When the impression is full, turn it on a piece of glass, and allow it to harden. When it is ready to separate, knock it out of the cup by tapping the handle gently. Cut it down from the back to the coloring matter, which will have penetrated the plaster. Break off the outer rim and the center will drop out itself; trim the model at once as desired, and it is complete.

Should the mouth be hard in some places and soft in others, a material is needed which will compress the soft tissues, and thus allow the plate to ride uniformly on the soft and hard parts. For this and all ordinary partial cases the modelling composition can be used to the best advantage.

Wax I seldom use, except in combination with plaster for some partial cases. The impression may first be taken in wax; then enlarge the imprints, and repeat with plaster; when hard remove, and treat the same as a full plaster impression, with this exception, that pins be placed in cavities to prevent fracture of the teeth in separating.

Modelling compound, if properly manipulated, will give most excellent results. The great trouble with four-fifths of those who use it is that they do not take time to prepare it properly, or expect to obtain good results from material which has been in use for years. Modelling compound deteriorates by use and age, and must not be used too long. Of the numerous compounds in the market, I prefer Ash & Sons'.

Having selected a cup with straight sides, about one-fourth of an inch larger than the arch, I soften the compound in boiling water, roll it into a ball, place in the center of the cup, and work it to the edge. If the arch be high, care must be taken to leave it high in the center and the surface free from wrinkles. Turn it over and dash some cold water on the back, then quickly pass the surface of the compound over the flame of a Bunsen burner. The water chills the back so as to give the compound a body, while the dry heat softens the surface, and a very sharp impression can be obtained with all the lines well defined. Place the cup in position, posterior end up first, raise the lip and press it up on the gums, and that which has run out the back also press in on the cheeks and lip from the outside. Allow it to remain until it fails to respond to pressure of the finger-nail, remove and cool, allowing it to remain in water until you are ready to pour it. Place pins in the cavities the same as described before. If this method be followed out, it will be found that modelling compound is not the poor material some have branded it. If the compound be simply heaped up in a cup and shoved into place, as I have seen some do, you cannot expect the plate to fit; for the simple working of it in the hands cools the surface, and it would be impossible to get a sharp impression.

Dr. S. Eschelman, of Buffalo, said that there was very little in the paper to which he could take exception. There were times when the question of what to extract would depend upon the condition of the patient; in some cases it would be better to crown a tooth which in another patient should be removed. In making a lower denture, for instance, for a patient advanced in life, if there are two or more teeth remaining it will be much better to leave these than to remove them, as the denture will be much more likely to be worn. The remaining teeth will help to hold the denture in place till the patient is accustomed to it, and if after a year or two they are extracted and a full denture is furnished, the patient will probably be able to endure it. He did not think best to push the posterior part of the tray up first when taking a plaster impression, but to put it to place horizontally, having the patient hold the head down or forward, so that the plaster will not go back to the throat. He favored the use of modelling composition in many cases, as being less unpleasant to the patient, and giving a better impression. An impression taken with plaster will be of the mouth when at rest; if modelling composition is used, it being more firm than soft plaster, will give more nearly an impression of the mouth when masticating food.

Further discussion of this paper was postponed till the two following papers on kindred subjects had been read. The first was by Dr. H. B. Meade, of Buffalo, N. Y., and was entitled,—

SELECTING TEETH, PLAIN AND GUM—THE BITE—ARRANGING —GRINDING—WAXING UP.

The first step after the model is obtained is taking the bite. We will suppose we have a full lower set, or nearly so, of natural teeth. Place a sheet of warm wax over the model and press it down well to make a trial plate. Now bend a piece of fairly stiff wire to fit slightly inside of the ridge, extending from heel to heel, secure in position with a little hot wax, then press a roll of softened wax on the ridge, trim off the lower edge to the proper length for the teeth, and try in the mouth. If the lower teeth do not touch the ridge of wax evenly, trim off or add more wax, as the case may require, until the contact is uniform throughout. Then trim the labial surface of the wax until the contour of the face is brought out (having the lips closed) as well as may be. Now cool the trial plate, and lay a sheet of warm wax on the articulating surface of the ridge, trim off to the width of the ridge, and insert in the mouth. To have the patient close the mouth naturally is often a very difficult matter. I find it a good way to stand in front of the patient, using the forefinger of each hand to hold the trial plate in position, and direct the patient to close the mouth, having the finger back in the region of the molar teeth. As they close they will naturally bite the fingers, which will invariably prevent them from protruding the lower jaw ; then gradually let the fingers slide out toward the cheek until the lower teeth meet the wax, then repeat the closing. If the lower teeth come in the same position the second time, we can feel satisfied that we have the proper relation of one jaw to the other. Then have the patient bite through the sheet of warm wax, mark the median line and the length of lips, and then remove. Take an impression of the lower teeth, either in wax or modelling compound, from which to make a plaster model, which will fit in slight impressions of the teeth made in the bite taken, and then place the whole on any good articulator, which can be set to maintain the relative positions.

Now we are ready for the selection of the teeth. The amount of time it would require to give this proper consideration will not permit me to go into the details. Suffice it to give a few hints on the subject. In no department of dentistry is more skill, judgment, and artistic ability needed than in the selection and arrangement of teeth. The late Dr. Allport once said, " He who has but moderate ideas of symmetry, harmony of expression, and color, is constantly pained by the lack of that artistic selection and arrangement of teeth which serve to restore to the face the shape and expression left on it by the Creator, the absence of which stamps him who should be an artist, an artisan, as a mechanic, a deformer of the human face divine." In selecting teeth, we have to consider their shape, size, color, and character. The dentist may be guided by the natural teeth remaining ; but should there be none, then we must study the physiognomy as well as the temperament of the patient. I am a strong advocate of plain teeth, and believe that in the majority of cases they could be used to better advantage. The excuse the dentist who uses gum sections generally makes is that the patients will not have anything else ; but were he to be converted from his sinful ways, and use plain teeth, then we would probably hear him say, " My patients will not have anything else. " I believe that nine-tenths of the failures are caused by the indiscriminate use of gum sections. I call them failures, because their appearance in the majority of cases is an outrage to the face. Although the mechanical arrangement may be entirely satisfactory to the patient, the artistic arrangement, as well as the contour of the face, has not been fully developed, and should the mechanic undertake an artistic arrangement his efforts would be largely aborted by the unnatural stiffness of the gum sections.

To obtain the highest success in artificial dentures, in addition to its utility, it must restore the contour of the face and lips formerly supplied by the teeth and alveolar process. It must also be in harmony with the general appearance, physiognomy, and temperament of the wearer. In order to fully comprehend these relations, it is necessary to study the general form of the face, both in profile and in full view.

There are only a few general directions that may be given in the arrangement of teeth ; no definite rules can be laid down, as each case varies as do individuals, the art of restoring expression being acquired only by observation and experience. The six anterior teeth should be arranged to form the arc of a circle, or nearly so, while the bicuspids are placed somewhat outside of this line, followed by the first molar in a position which would be described by a straight line drawn from its buccal surface touching buccal surfaces of the bicuspids and extending to the cuspids. The ten anterior teeth should be arranged so that when placed on a flat surface they will have uniform contact, with perhaps the laterals excepted. The molars should be shorter and on an oblique line toward the condyles. Slight irregularities are sometimes artistically helpful, and in some cases irregularities to a marked degree add much to the natural appearance ; but here, too, judgment is required, as well as the study of the physiognomy and the general build of the patient. For a lady with regular features well developed, irregularities, except slight ones, are to be avoided. For a patient who is tall and slender, with a narrow face, the underlapping of the laterals and slightly shorter may be in perfect harmony with the general development, while on the other hand a short, stout-built person would require the laterals fully as long as centrals, and an overlapping may not be objectionable. In all cases the necks of the laterals should be *in* more than centrals, and the necks of cuspids more *prominent* than any of the anterior teeth. If the bicuspids should be too large for lower teeth, so that they do not meet properly, grinding on the approximal surfaces will overcome the difficulty, and this should be done that we may obtain the best results in masticating.

In waxing up the case, it should be remembered that in the vulcanized plate we have an exact reproduction of the waxed-up piece ; hence wax up the case exactly as you want the piece when completed. To smooth the wax, coat the surface with oil, and a few puffs with the mouth blow-pipe will render the surface perfectly smooth and uniform, the oil seeming to facilitate the flowing of the wax. Any adherent particles of wax may be readily removed from the surface of the teeth with a pledget of cotton dipped in chloroform. The case is now ready to be invested.

Immediately following was a paper by Dr. Geo. B. Snow, of Buffalo, N. Y., entitled,—

Flasking, Vulcanizing, and Finishing Rubber Plates.

Before flasking the plate, which is now secured to the model and "waxed up," as it is termed, attention must be paid to its peculiarities, as different plates will require different treatment. It may have either plain or gum teeth, or both. The teeth may be set close to the model, and be intended to bear closely against the gum, or they may be at a distance, the rubber extending under them, and making the fit. The alveolar ridge may be thin and projecting, or low and of easy draft. We may have a facing of pink rubber, with either red or black rubber behind it. The manner in which the model and plate are to be placed in the flask will be modified according to these circumstances.

If the teeth are set close to the model, the latter is made thin, and set low in the flask, or possibly a deep-bottom flask is employed. The plaster is built up against the teeth to their cutting-edges or grinding-surfaces, and the teeth thus retained in contact with the model, and the intrusion of the rubber prevented as far as possible. If the rubber passes under the teeth, forming a band above the artificial gums when gum teeth are used, the position of the model in the flask will depend upon the shape of the alveolar ridge. If it be thin and projecting, and especially if the gums of the section teeth are set close, and hook over it, the front of the model must be raised, so that the projecting portion will be parallel, or nearly so, with the guide-pins of the flask ; otherwise there may be a breakage when the flask is opened. For such cases, the parallel-sided guide-pins of the ordinary flask are rather objectionable ; and they can be improved by filing away a corner on each pin, nearly, but not quite, to the face, so that the two halves of the flask may move diagonally, and thus follow the lines of the model in these difficult cases. The plaster outside the teeth must, when gum teeth are used, the rubber passing under them, be kept low enough to make the parting line pass along the rim above the gums. Or if plain teeth are used with pink rubber facing, the parting should be at the very edge of the rim, so that any escaping rubber can pass into the gateway without dislodging the pink. The appearance of a streak of black or red rubber in the middle of the pink facing is not likely to induce perfect composure of mind, and it is always best to make the parting joint where it will be the least likely to allow of it.

If it is desired to save the model after vulcanizing, provision must now be made for its being easily got out of the flask. The exposed edges below the plate are cut away, and the model is then treated with soap. A little rapping will then bring plate and model out of the investment.

In case of full sets, mounted with section teeth, now is a good time to do something toward counteracting the effects of contraction. I would recommend, for this purpose, a jack-screw, its points to be imbedded in drops of wax, placed closely under the second molars, or as far back on the plate as possible. If the jack-screw is then wrapped in tin foil, the plaster will be kept from it, and it will come out of the flask in good condition.

The operator having a clear idea of the exact position the plate and model are to occupy in the flask, the lower section of the latter is now partially filled with plaster. The exposed part of the model is set into water for a few seconds, long enough for its surface to take up enough to prevent its abstracting too much from the fluid plaster, and it is then quickly carried to its position in the flask, and held there for a few moments until the plaster has solidified sufficiently to retain it. There is a point to be observed here as to the wetting of the model. If it is not wet, it may take up the water from the investment so quickly that it cannot be carried low enough in the flask. If it is thoroughly soaked, it will not abstract any water from the investment, and it may become necessary to hold it for a long time before the latter will acquire consistence enough to retain it in position. When it is so retained, the filling of the lower section of the flask is completed ; the plaster being built up against the teeth, if this is required, and otherwise suitably disposed to form a parting. When hard, it is cut away with a knife, to smooth and correct the surface. To prevent its sticking to the other half of the mold about to be made, it may be varnished and oiled, or covered with a strong lather of soap, to be rinsed off. Either way accomplishes the purpose.

The ring section of the flask is now put on, care being taken to see that it fits accurately, and it is filled with plaster. This should be mixed thin enough to pour readily, and poured into one place ; the plaster being allowed to run around as the flask fills, to expel the air before it. It may be assisted by jarring the flask. When full, the cover is put on, and the flask is allowed to remain until the plaster is thoroughly set. Sulfate of potash is often added to the plaster to make it set more quickly ; but I do not approve of the practice, as I do not believe the plaster is as hard with this addition as without. It may be also observed that there is little or nothing gained by using very little water in the plaster. Enough may be used so that the mixture will flow quite readily, and when set the mass will be as hard as though less water were used.

I believe in allowing plenty of time for the plaster to become thoroughly hardened before vulcanizing, and I believe that the darkening of the joints, when section teeth are used, is in some instances, partially at least, owing to the undue hurry of the dentist to get the case into the vulcanizer.

The flask is now warmed sufficiently to soften, without melting, the wax of the base-plate and its halves separated. The base-plate is now carefully removed and saved, in order that the amount of rubber necessary to replace it may be ascertained. After its removal, the mold is washed with boiling hot water, to melt and remove any small fragments of wax which may have been overlooked.

Gateways are now cut for the reception of surplus rubber by removing the entire parting face, excepting a narrow margin surrounding the mold. This, I insist, should never be cut into, it being one of the vital points in doing good vulcanizing that the rubber in the mold must be absolutely imprisoned, having no opportunity for escape when the flask is fully closed. The removal of the surface, as described, is imperative, for if it is left, the escaping rubber will be squeezed into a thin sheet, which will resist and render impossible the perfect closure of the flask. I do not think of any circumstances under which I would leave any of the parting surface, except the narrow margin I mention, nor do I know of any in which I would cut passages through it, excepting the flask were to be closed, and rigidly held closed by bolts or clamps, either of which is an abomination.

To give the rubber a smoother surface, and to prevent the adhesion of the rubber to it, the surface of the mold, or at all events that of the model, is now either covered with tin foil, or treated with collodion or liquid silex. The former is cemented to the model with thick shellac varnish, and if afterward rubbed with soap, it is quite readily peeled from the rubber. Thin foil, such as is used for filling teeth, is used for this purpose, and if it should stick to the rubber it can be dissolved by immersing the unfinished plate in a bath of hydrochloric acid for a short time. The action is hastened by the addition of a small quantity of nitric acid.

Collodion is sold at the dental depots under the name of ethereal varnish, and at an extravagant price. Any photographer can furnish plain collodion, which will answer the purpose equally well, and for less money. This is painted onto the surface of the plaster before packing the mold.

Liquid silex, or soluble glass, is quite largely used for coating the mold, and serves an excellent purpose, but it requires some precautions in its use to attain the best results. First, the surface of the plaster must be clean, so that it will freely absorb the silex when applied. If it has been oiled, or if wax has been melted into it, the silex will not be absorbed, and though it may be of some benefit, will not be fully successful. Secondly, the silex must be quite thin, and should be diluted by the free addition of boiling water. It is well to have a second vial into which a small quantity can be poured and diluted for use. It must be kept free from fragments of plaster or other dirt, as it is easily decomposed. Thirdly, it should not be applied until a very short time before the mold is to be packed and vulcanized. After a few hours the silex is decomposed by the action of the plaster upon it, and a part, at least, of its good effects will be lost.

That portion of the mold which is to form the lingual surface of the plate should be carefully examined before the application of any coating to it, and if there are any little humps or protuberances upon it, they should be carefully shaved off with a sharp knife. Each one of these will make a hollow in the lingual surface of the plate, and increase the amount of labor necessary to scrape and finish it.

If section teeth have been mounted upon the model, it now becomes necessary to protect the joints against the intrusion of the rubber. This may be done by working a little liquid silex into them with a very thin instrument, and following it with a little dry plaster. A thin mixture of oxychlorid or oxyphosphate of zinc may also be used. In my own practice, I have been better satisfied with the results I have attained by the use of a few fibers of cotton wool than anything else I have used. The corner of the joints where the packing is to be inserted should be slightly chamfered when the teeth are set up, and the little V-shaped groove thus formed packed with a few fibers loosely twisted into a thread. The ends are secured by forcing them into the plaster above and below.

The next step is to pack the mold; and, though it is not absolutely necessary to do so, I prefer, and think it advisable, to first ascertain the quantity of rubber necessary for the purpose. If the base-plate consists entirely of wax, and the plate is to be of ordinary red rubber, twice the weight of the base-plate in rubber will fill the mold. This rule will give rather too much black rubber, and scarcely enough light red or pink, as the specific gravities of different rubbers vary widely. The quantity can be ascertained by immersion, by putting the base-plate, molded into a lump, into a narrow vessel partly filled with water, and, after noting the level of the water, withdrawing it, and passing in rubber until the level of the water is restored. The flask should now be warmed, and the rubber softened by putting it on a plate, over a vessel of hot water, and the mold carefully packed. Narrow strips of rubber are first packed around the pins, and the remainder added in as large pieces as may be convenient.

To allow of reopening the flask after closing it, that it may be seen to be properly packed, a piece of muslin may be laid over the exposed surface of the rubber ; or if it has been necessary to pack both sides of the mold, two pieces of muslin may be used, to prevent the annoyance of having the rubber stick to both sides of the single piece.

The flask is then to be heated, preferably by boiling it, and then closed, either in a clamp or with bolts. It is then reopened, the muslin stripped off, and if it is found to be insufficiently filled, rubber may be added ; or, if too much has been used, the surplus, found in the gateways, should be removed.

The flask is now ready for the vulcanizer, but should be either put into a spring clamp, or the bolts should have springs upon them if they are used for holding it together. The flask should be held under an elastic pressure, so that as the rubber in the mold expands by heat the flask will yield to the pressure thus exerted, and will be prepared to follow up the rubber as it shrinks in vulcanizing, and maintain a steady pressure upon it. If the mass of rubber in the mold is not too thick, it may in this way be held up to its position, so that it will, when done, be in close contact with the teeth and pins. If the mass is of an unusual thickness, say over an eighth of an inch average, some other provision should be made to prevent the escape of the rubber. When colored rubbers are used, this may be accomplished by placing the flask in the vulcanizer with the bolts slack, so that it is free to open, and vulcanizing a third or half of the time, thus hardening the rubber sufficiently to prevent its flowing easily. The vulcanizer is then allowed to cool, and the flask is removed, the spring pressure applied, and it is then replaced and vulcanized for the remainder of the time. Black rubber, or pure rubber and sulfur, is more difficult to deal with, and will not give satisfactory results under this treatment. When this is used for thick pieces, pieces of sheet metal, of the proper thickness, should be interposed between the parts of the flask to prevent its being fully closed, and it should be held rigidly in this condition during the first half of the time of vulcanizing. Then the props should be removed, and the flask allowed to close under spring pressure during the remainder of the time. I am not sure but there is an advantage in this case in slow heating, allowing an hour or more to be consumed in reaching the vulcanizing point.

Much more care and thought than is usually given to the vulcanizing process is necessary if the best possible results are desired, and the kind of plate which is made while the patient waits is far from being a creditable production.

Better results will be attained if a longer time than an hour is given to vulcanizing. A much better and tougher plate will be had if it is allowed to remain in the vulcanizer two hours instead of one, the temperature being proportionately lowered. It must be remembered that the 320 degrees of the mercury bath thermometer indicate about 340 degrees for the flask and its contents, and that it is utterly impossible to vulcanize rubber so as to be satisfactory for dental purposes at 320 degrees actual temperature in much less than two and a half hours. Very thick pieces, especially if of pure rubber and sulfur, will require even a lower heat and longer time than this to prevent them from becoming spongy in the center.

The plate being vulcanized and removed from the flask, is ready for finishing. But it will be remembered that, supposing it to be a full set with section teeth, I advised the use of a jack-screw to be placed across it at the rear. If this is done, it will be found to be quite closely held when the plate is vulcanized, on account of the contraction of the rubber in cooling, and its action in conjunction with the arch of porcelain formed by the teeth ; porcelain having but little expansion under the application of heat, while rubber exhibits the greatest amount of it of any solid body. The amount of change may be measured with a fair degree of accuracy by observing how far the screw can be turned before it becomes slack, and the contraction can be practically overcome by spreading the plate to the same amount by turning the screw, bedding the plate in something to prevent accidental warping, as, for instance, a flask full of powdered soapstone, and subjecting it to heat enough to soften it. This may not be much higher than 212 degrees. It is not necessary to bring it to, or near the vulcanizing point, though the vulcanizer affords a convenient means of heating it.

The plate is then filed into the proper shape, and its surface scraped, sand-papered, and polished. I do not know that I can offer anything new about this part of the process, and will therefore leave it, as I fear I have already trespassed upon your time.

Discussion.

Dr. C. A. Allen, of Buffalo, said he was in favor of full dentures when possible. He advocates a supporting rim of wire, and the careful study of the trial plate in the mouth and the careful examination of it when removed from the articulator. The essayist presented a, to him, new method of getting the bite. He employed the usual method with the usual success, but generally found upon insertion of the trial plate that changes could be made which would make it fit more perfectly. The selection of the teeth has much to do with the artistic success of the denture. Attention must be given to the age, temperament, and general expression of the patient in their selection. The temperaments are roughly divided into four classes : the bilious, the sanguine, the nervous, and the lymphatic, and the teeth of each class have clearly defined peculiarities. In persons of bilious temperament the teeth have lines well defined, are large in size, long in proportion to their breadth, and yellow in color. In the sanguine the lines of the teeth are not so well defined, the color lighter but still yellow. The nervous temperament is possessed of beautiful teeth with pleasing color, pearl blue or gray, inclined to translucency, and marked with well-defined lines and good cusps. These teeth decay, however, more readily than any others. The lymphatic teeth are the ugliest of all, having little definition of outline, with bad color and generally inartistic appearance.

He preferred the use of plain teeth rather than gum sections ; they give better satisfaction, as they can be arranged upon any plane or angle to be identical with the teeth they replace, and give more individuality to the case. In using sectional teeth, in many cases too much is ground off the upper part of the section, bringing the cutting-edges of the teeth too far apart. The idea should be to keep the stone from contact with the upper part of the section. Care should be taken not to grind away the front of the upper part of the gum-section teeth so the rubber would flow over the top, as in contracting during vulcanization it was liable to crack the section by shrinkage.

Dr. F. A. Greene, of Geneva, gave a description of vulcanizing on a metallic surface. He sets up the teeth with wax, which he covers with tin foil, working it down to the wax with a burnisher closely around the necks of the teeth, and stipples the surface of the gums. When the case is separated, the tin foil will come away with the part containing the teeth, and will give a hard, very smooth surface to vulcanize the rubber against. A case vulcanized this way will be so perfect that it can be finished in much less than the usual time.

To prevent dark joints, he placed a piece of pink rubber back of the joint, and finds it very satisfactory, as the rubber is not soluble in the mouth.

Dr. G. B Snow asked what method he uses to hold the flask in the vulcanizer.

Dr. Greene replied that he used a Seabury press.

Dr. C. A. Allen said that modelling compound gave him no such good results as Dr. Fay claims for it, and thought in the great majority of cases plaster was to be preferred. It is only in cases where there are teeth so loose that plaster would be liable to remove them that he thought modelling compound should be used. In ordinary cases modelling compound is unreliable in direct proportion to the difficulty of the case. Where there were overhanging teeth or parts the modelling compound would bend, while what was needed was something that would break, and when the pieces were put together would be an exact cast of the mouth.

Dr. M. D. Jewell, of Richfield Springs, said that he was brought up upon plaster, but now preferred modelling composition, especially for lower dentures. It took him a long time to learn how to use it, but he finally succeeded. In getting his impression with it in partial cases, he found it difficult to prevent its drawing from the palatal portion, but he learned to remove it from the mouth after the impression was partially taken, and soften the surface of the composition over a flame, and then replace it in the mouth and press it firmly to place. In this way he got a good impression. In using plaster he soaks the cast thoroughly with water before packing; thus he gets a perfect cast without pits or roughness. He objects to the use of soap, as it softens the surface, but uses shellac, varnishing the plaster thoroughly, then lathering it well with soap. In this way he gets a cast perfectly smooth.

Dr. F. H. Lee, of Auburn, uses a combination of wax and plaster, takes a wax impression first, then puts plaster in the cup, covering the wax, and takes the impression with this. In this way he gets a perfect impression with less time, and saves the patient the annoyance incident to taking a plaster impression.

Dr. W C. Barrett, of Buffalo, said the difference between a mechanic and a botch is skill. The mechanic has it, the botch lacks it. In making an artificial denture, attention should be paid to the shaping of those parts of the gums which affect the expression of the face. Study should be given to the oris orbicularis muscle, and if this is done, we would modify the shape and form of the plates. This muscle is made up of the fibers of other muscles which mingle together, and diverge and converge to form this muscle of wondrous expression, which should be carefully studied by every one who makes an artificial plate. Unless the plate is so shaped as to accommodate this muscle, there will be a sneering expression of the lip. The muscles of the lower lip must also be taken into account, or the expression of the mouth will be spoiled. The fossæ of the incisors and bicuspids are the points where these muscles are placed. Therefore, in making an artificial plate, attention must be given to these eminences and fossæ, or a good expression will be impossible.

Speaking of gum sections, Dr. Barrett said, "If there is any abomination in dentistry which I entirely despise, it is gum sectional teeth."

Dr. Snow said, in taking an impression with either composition or wax, it was best to put a portion of the material in the back part of the cup, and let it get a little hard, then put the rest of the material in the cup, and get it pressed closely to place before it got hard. He varnished his casts with several coats of varnish, then lathered it well with soap. He has no trouble with softening the plaster, nor in separating.

Dr. J. B. Willmott, of Toronto, Canada, favored the use of impression compound ; was glad to have something better than plaster. In using the compound, it is necessary to remember that if used in large masses it will settle and alter its shape ; and also that if it is removed from the mouth before it becomes quite hard it will creep and shorten up. These facts must be borne in mind, as they forbid its use in thick masses. The impression tray must be adapted to the mouth, and it must be kept in the mouth till thoroughly hardened. Bearing these directions in mind, there is no material so satisfactory as this. He thinks the English composition better than the American.

Using plaster, there is the danger of getting an inclosed bubble of air. This can usually be avoided by getting the anterior part of the tray up first and the posterior up later. Impression compound is so much stiffer than plaster that the air will be forced out. In reference to the selection of teeth, he said the tendency was to select those which were too small and too light. It is better, if an error is made, to err in the other direction. In arrangement, there is a bad tendency to protrude the bicuspids, giving the mouth the appearance of having too many teeth. The cuspid should hide the bicuspid, so that looking at the mouth from the front we should see the labial surfaces of the incisors and cuspids only.

Dr. Richard Kessell, of Buffalo, said he had heard Dr. Allen, in opening the discussion, speak of using a wire to stiffen the band. He used the same wire in vulcanizing to strengthen the cast. He formerly used plaster for taking impressions, but now used modelling composition with more satisfaction. He was experimenting now with very small plates strengthened with German silver wire, the plate only about twice the width of the wire.

Dr. S. E. MacDougall, of Clinton, preferred plain teeth for most cases, but when the gums were very much exposed gum teeth are absolutely necessary to give a life-like appearance. In his opinion, mechanical dentistry is the very highest expression of the dental art, and the successful mechanical dentist must be a better artist than the operative dentist need be. Plain teeth are better than block teeth, because they are usually more artistic. Rubber should be kept under pressure all the time it is in the vulcanizer. He preferred plaster for most cases. He spoke of a patient who had tried several dentists to make a dental plate, but none of them could succeed in getting an impression, as there were four teeth which protruded inward. He had placed a small piece of plaster against each of these teeth, and thus got a plain surface and easily took an impression. In putting the plate in, it had to be put back and then slipped forward under the teeth.

Dr. S. Eschelman spoke of handling the compound by placing a siphon in the mouth, and then by means of a chip-blower throwing cold water into the mouth upon the compound to hasten its hardening, the siphon carrying the water out. He spoke of a difficult case which he had had, a V-shaped arch having soft places in the palate around the sides of the arch. An impression taken in plaster would be of the same shape as the arch, and a plate made from it would not remain in place; an impression taken from modelling composition showed a dome-shaped arch, and the plate was worn with comfort.

Dr. T. W. Brophy, of Chicago, said the subject of mechanical dentistry was of great importance and had been too much neglected. He was glad to hear it receive so much attention. Many of those who enter our colleges think mechanical dentistry of little consequence, and it is difficult to get them to qualify themselves to practice dentistry by familiarizing themselves with laboratory work. Preceptors should persuade their students to pay more attention to this branch.

As we become more familiar with the means of saving teeth, it would seem that there would be less need for artificial dentures. The increasing knowledge of oral hygiene should enable many to escape the necessity of wearing artificial teeth. The medical profession should do more than they ever have done to teach the people the means and the need of oral hygiene, and if they and we can get them educated up to the possibilities of hygiene there would be no need of mechanical dentistry except for the aged, whose teeth naturally get loose and fall out. There is great necessity for caring for the mouth after the artificial denture is in. No artificial denture is a permanent denture. The alveolar process will shrink until the force of mastication will come upon the hard palate, then a new plate must be made. Throughout life new plates must be made, and a general oversight is necessary to escape trouble. Badly-fitting plates may cause irritation of the parts and ulcerations, which may even end fatally.

Especially in lower dentures, when they are put in the mouth directly after the teeth are extracted, they will become loose and fit badly. For these reasons, every person wearing a plate should have the mouth frequently examined.

Dr. Fay still adhered to his opinion that the best way in taking an impression was to put up the posterior end of the cup first, then lower it and put up the plate more level. He never had any trouble with air-bubbles.

Dr. Meade said that the ground covered by his paper was not discussed very much, and he had no remarks to make in reply. As a method of getting a natural gum color with pink rubber, he advised bleaching the rubber by immersing in alcohol for a time.

Dr. Snow said the first vital point in vulcanizing is to remember that rubber will shrink in vulcanizing and expand with heat; therefore there should be no gates cut in the plaster, and the flask should be under spring pressure while vulcanizing. In regard to the assertion that the progress of dentistry will enable us to do away with artificial teeth, he thought that in the case of wealthy patients it perhaps would, but many artificial dentures are made for young people who are unwilling or unable to pay for saving the natural teeth. If the natural teeth are retained till the age of forty years, or even thirty, there will not be so much trouble, as there are fewer changes in the mouth after that age, and the plates may probably be worn as long as they are needed.

Subject passed, and the convention adjourned till evening.

(To be continued.)

ACADEMY OF STOMATOLOGY.

A regular meeting of the Academy of Stomatology was held November 13, 1894, at 1513 Walnut street, Philadelphia; the president, Dr. Louis Jack, in the chair. After the transaction of the usual routine business, Dr. Kirk exhibited some specimens, and said concerning them,—

Some time ago there was presented to me for examination, by Dr. Bogardus, of Keyport, N. J., a very interesting case, which I think is absolutely unique. I have no knowledge of any such state of affairs as is here represented. It is a complete denture, comprising an upper and lower set of artificial teeth, which Dr. Bogardus, who made them, assures me were not even touched upon their cutting- or grinding-surfaces with a corundum wheel, not even the fire-glazing removed. They were worn in the mouth of the patient—a woman—for something over three years. She had a habit of clinching or grinding her teeth together, especially at night, and the result is that these two sets of teeth have ground their way a distance equal to fully one-half the length of the crowns, one into the other, by the percussive action, until there is most perfect articulation. We often see this state of affairs produced by abrasion in the normal human denture of advanced life, but to find it accurately reproduced in an artificial set of teeth is, I believe, absolutely unique.

The case has been examined by a number of dentists, but none of them has ever seen anything like it. It seemed to be so valuable and interesting that I wrote to the dentist who sent it to me, asking if he would not deposit it in the museum of the Academy of Stomatology. I have his permission, and the case is now donated to the academy by Dr. O. C. Bogardus, of Keyport, N. J.

I have to present also another addition, by Dr. Naaman H. Keyser, of Philadelphia, exhibiting his method of fusing gold fillings into artificial teeth. It consists of a set of samples showing the results of his method, as published in the DENTAL COSMOS of August, 1894.

Dr. Kirk moved that a vote of thanks be tendered these two gentlemen by the Academy, and conveyed to them by the secretary. Motion seconded and carried.

Dr J. D. Thomas here read a series of resolutions in regard to the celebration of the fiftieth anniversary of the discovery of anesthesia by Dr. Horace Wells, pledging the hearty support of the Academy and its cordial co-operation in that movement, which were adopted.

The paper of the evening was then read by Dr. Edward C. Kirk, on "Dr. Hewitt's Method of Using Nitrous Oxid and Oxygen as an Anesthetic Mixture."*

Following the reading of the paper a demonstration by the essayist was given of Dr. Hewitt's method, in which the improved apparatus made for Dr. Hewitt by Barth & Co., of London, and described by Dr. Hewitt in the *Journal of the British Dental Association* for June 15, 1894, was used.

Two patients, young women, were anesthetized for the removal of carious teeth. Dr. J. D. Thomas performed the operation.

In the first case, one hundred and ten seconds were consumed before the corneal reflexes were fully abolished, and as nearly as could be determined there remained forty seconds of available anesthesia after removal of the face-piece.

In the second case, one hundred and sixty seconds were consumed in the administration, resulting in thirty seconds of available anesthesia.

It should be noted that the increased length of time consumed in the administration in the second case was partly due to the failure of the administrator to keep up the supply of nitrous oxid by continuously inflating the bag, which for an instant was allowed to collapse. In consequence the patient inhaled an undue proportion of oxygen, which delayed the administration considerably. Otherwise the symptoms presented by both cases were singularly alike. Professor W. W. Keen, of Jefferson Medical College, took charge of the pulse, and reported at the close of the administrations that but slight variation, either in fullness or frequency, was noticeable.

There were none of the usual symptoms of asphyxia manifested, there being entire absence of blueness, stertor, or jactitation. The appearances presented during the anesthesia were much like those of normal deep sleep.

Following these cases, Dr. J. D. Thomas demonstrated his method of administering nitrous oxid with admission of atmospheric air, using the nose of the patient as a valve for the purpose.

The patient was a young man who desired the removal of a carious tooth. Seventy seconds were consumed in the administration, giving thirty seconds of apparently available anesthesia. There was absence of stertor and jactitation. A slight blueness of the lips was observable during the administration and upon withdrawal of the mouth-piece.

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* For Dr. Kirk's paper, see page 973, current number.

Discussion.

Dr. J. D. Thomas. I recognized ten or twelve years ago the dangerous element of asphyxia in giving nitrous oxid, and it came in this way. In operations requiring considerable time it was considered dangerous to continue the inhalation long, but by alternating a breath of air with a breath of gas it seemed to overcome all dangerous symptoms which accompany the asphyxiated condition from the use of pure nitrous oxid. Even in that class of persons who asphyxiate very easily, showing oxygen-starvation which begins as soon as the first or second breath is taken, the admission of a little atmospheric oxygen will relieve it, so that has been the method which I have followed for ten or twelve years in certain cases, but not in all.

In giving nitrous oxid, the only danger accompanying it, in my mind, is the want of oxygen. That is exhibited in numerous ways. All the deaths that have occurred, when not by accident, and which have resulted from the physiological action of nitrous oxid, have been, to my mind, from the want of oxygen.

As to accidents, many things might occur. Among others, the one where there is considerable jactitation producing constriction of the glottis. This is the result of asphyxiation, and one breath of air will relieve it entirely. Yet the glottis may be so constricted as to produce actual suffocation ; one or two have died in that way. That is, in my judgment, an accident, for as soon as the patient gets a breath of air, he is safe. If the trachea had been opened below the larynx, it would have been obviated.

Another phase of the want of oxygen is that shown in the respiration of people who breathe very slowly and who never oxygenate the blood to the proper degree in normal respiration, and who thus never get a full supply of oxygen. The moment it is reduced or cut off they immediately show an asphyxiated condition, and sometimes very quickly a suspension of breathing, which is perhaps the first exhibition of danger. Most of the deaths have been shown to have been by suspended respiration, the heart's action continuing some time afterward, sometimes ten or eleven minutes.

Now there is the other extreme, the class of anemic people ; their blood is lacking in red corpuscles to such an extent that the lips show no color at all. I have seen cases of this anemic character which will often succumb, after taking the second breath of nitrous oxid, before any effect could possibly have been made on the nerve-centers directly by the gas. It is not the effect of the anesthetic, but simply want of oxygen, a starvation of the nerves that control the action of the heart.

These are the two conditions which, to my mind, are dangerous ones in giving nitrous oxid.

With the extremely anemic, by the admission of air we can obviate the asphyxial condition so that they can be carried to a state of unconsciousness without any of those symptoms occurring, and we may be possibly a half-hour in giving the gas. Again, the extremely florid show the effects of anesthesia very readily, simply because they demand all the oxygen that the lungs will supply to aërate their blood sufficiently ; when you cut off any of it, the blue appearance will take place almost immediately, with the second or third breath. If you continue, without the admission of oxygen, they will discolor and be affected to such an extent as to go into convulsions,—not only jactitation, but absolute convulsions. I have seen that take place.

The giving of atmospheric oxygen in these cases was a natural sequence following upon my observation of these conditions.

In the case to-night, I used a little more air than I intended to, the inhaler being one that I have not used for some time ; but where the pipe is perfectly free and directly attached to the gasometer, and you can control it, as soon as the first symptoms of unconsciousness take place the palate will fall, which you can see with the mouth open, and you can let the nose open and a little air go in, so it is a very easy thing. I like the mouth inhaler much better than the one with the face-piece which Dr. Kirk exhibits, as the only guide the operator has in giving the gas is the length of time and the general effect of the gas upon the patient.

In giving gas with the face covered up, there is very little you can go by. You want the lips exposed, so as to show the instant the anesthetic takes effect. I am guided entirely by the lips, and when the lips are covered over you have lost the principal guide in giving the anesthetic. It is an actual fact, I believe, in nearly all cases of death that have occurred from the use of nitrous oxid, that they have been under use of face-pieces. If the lips begin to turn blue, excessively, for instance, at the third or fourth breath, it is little short of criminal to continue the administration, because suspension of the breath will take place with constriction of the glottis, to such an extent that there might be a serious accident. With the face exposed, if the patient is beginning to color up very decidedly at an early stage, atmospheric air will relieve it. I conceive Dr. Hewitt's idea would be a very good one in cases of persons who have not had experience or are not making a specialty of it. Intrinsically it appears to be a very excellent thing, as shown to-night.

Professor W. W. Keen. I have been very much interested in the exhibition this evening. I do not know that I am able to say very much, because I do not feel familiar with nitrous oxid. In one respect I am a little disappointed. I was strongly in hopes that we might have a method by which the anesthesia might be prolonged so that we might use it for an hour or a half-hour, and that it might replace ether and chloroform, which unquestionably are much more dangerous anesthetics. I certainly think that it is a great credit to your profession that you have demonstrated to the world the great value of nitrous oxid as an anesthetic. I had hoped that we might use this safer substitute for the much more dangerous ones we use in general surgery, but I am afraid, from what I see in Dr. Hewitt's book, and from what Dr. Kirk says, that the duration would probably be but a very few minutes,—I should suppose not over ten or fifteen minutes.

I observed the pulse of but two of the patients to-night. The first one I noticed was already taking the anesthetic when I felt the pulse. It was then one hundred and twelve, and did not vary from that until the end. I observed no special variation in force. In the one in which Dr. Thomas gave the nitrous oxid, the patient was evidently very nervous, to begin with, his pulse beating at one hundred and thirty-two, and continuing that much from the beginning to the end. Therefore, in the two cases, the effect on the frequency of the pulse seemed to be almost nothing, and I could not discover any difference in force. I have been very much interested, because it certainly illustrates that you can anesthetize perfectly with nitrous oxid, and you make it, as it seems to me, very much more safe by the means of oxygen. I have been very much interested in the work of the evening.

Dr. E. T. Darby. I am asked to tell what I saw of this method in London. We were very much pleased with what we did see. We were invited to the London Dental Hospital to see the gas administered. We saw Dr. Hewitt and his assistant give it to perhaps ten or a dozen patients, and, as Dr. Kirk has said, we were exceedingly pleased with the results. We were greatly amused at one feature,—viz, to see how quickly they hurried the patients out after administering the gas. I think, save in one case, we saw no discoloration of the face. You probably noticed this evening—those of you who were near enough to see the countenances and complexions—that they retained their normal color. There was not the slightest change in the lips or the face that we could detect. I do not know, however, that this is a thing of any great importance to us when Dr. Thomas administers the gas for us so successfully.

Dr. M. H. Cryer. I desire to record here the fact that twenty years ago, in his lectures to the students of the Philadelphia Dental College, Professor John Hugh McQuillen taught that nitrous oxid is a true anesthetic agent quite apart from its asphyxial factor. He presented this view of the case and his reasons therefor before a meeting of the Academy of Natural Sciences of Philadelphia during the winter of 1878 or 1879, as nearly as I can recollect the date.

Dr. Kirk. I want to correct one idea of Dr Thomas's that is erroneous,—namely, that the time of administering the mixed gases is in any sense a guide to the condition. We were simply timing the administrations as a matter of record, and not as a guide for the anesthetic condition produced.

There is another point to be borne in mind in relation to the face-piece as used in this method. By Dr. Hewitt's method, you are giving oxygen in connection with the nitrous oxid almost from the start, and the patient is getting a certain amount of oxygen immediately. There is no time when the patient is not taking some oxygen. Consequently, the chances of oxygen-starvation are very much lessened, the asphyxial condition to which Dr. Thomas alludes being constantly prevented, and we thus eliminate what is a very potent element of danger in giving nitrous oxid alone.

I quite agree with him as to the danger of proceeding with the administration where the patient so quickly succumbs and becomes cyanotic under pure gas. There the face-piece, I admit, is a serious objection ; but in the method of Dr. Hewitt, the fact that we are giving oxygen continuously with the nitrous oxid is a safeguard against any accident which may occur from the inability to see the lips.

Dr. A. H. Porter referred to published experiments of Dr. Benjamin Ward Richardson, in which he had made a chemical examination of the expired gases, and had found that the residual oxygen, after having been completely freed from carbonic acid, possessed properties decidedly different from ordinary oxygen which had not passed through the lungs. The expired oxygen was found to possess poisonous and narcotic properties. Dr. Porter felt that the chemical changes involved in the vital processes of respiration were important factors in the study of anesthesia, and also of ordinary sleep. He believed that a careful research in this department of physiological chemistry would throw light upon the causes which determine the difference between ordinary sleep and that which is troubled by dreams and is otherwise abnormal. This latter type, which he contended prevailed when air instead of pure oxygen was mixed with the nitrous oxid, must be due to some trammeling effect, as that of nitrogen in its mechanical mixture with oxygen in the atmosphere.

INCIDENTS OF PRACTICE.

Dr. Gaskill exhibited a specimen consisting of a partial lower denture which had been worn without removal for seven years. On the lingual surface of the plate was a large concretion of salivary calculus fully an inch in depth, and in thickness corresponding to the width of the plate. The specimen had been sent over from France.

Dr. T. F. Chupein. At the meeting of the Pennsylvania Association of Dental Surgeons, Dr. John Hellings reported a very similar case. The specimen he showed was an accumulation of tartar over a second molar attached to a plate in the upper jaw, covering that tooth entirely. The plate was made for the party twenty-five years previously. The deposit of tartar measured one and one-fourth inches long, and about an inch in diameter. It was the largest piece of tartar I had ever seen. I presume, from what Dr. Hellings said, that the plate had not been taken out of the mouth during the whole period of twenty-five years.

Adjourned. GEORGE D. B. DARBY, *Secretary.*

AMERICAN DENTAL ASSOCIATION.

(Concluded from page 899.)

FOURTH DAY—*Morning Session.*

THE association was called to order at 10 o'clock A.M., President Patterson in the chair.

Section III, Operative Dentistry, was called, and Dr. S. C. G. Watkins, temporary chairman, read a brief report, in which it was stated that, owing to the absence of both the chairman and the secretary of the section, there was no record of any work having been done. A number of new appliances had been presented to the section which they deemed worthy of being brought to the attention of the association, as follows: A traction engine, by Dr. Charles Sill, for use in making sub-cervical bands, etc.; a new engine-bur, a handpiece, and an engine by Dr. J. N. Crouse; a new phosphate of zinc cement, also by Dr. Crouse; an antiseptic preparation, known as wood wool, for use as an absorbent; and the Edison-Lalande battery and motor outfit, by The S. S. White Dental Manufacturing Company.

Dr. C. N. Peirce, Philadelphia, wanted to say a word about the cement mentioned in the report, which is a pyro-phosphate. It is claimed that the great heat to which this is subjected in the process of manufacture makes it less soluble in the mouth than other cements. He had experimented with it for four or five months, and while he would not say it was insoluble in the fluids of the mouth, he had found it less so than cements usually are.

The section was passed, and Section V, Materia Medica and Therapeutics, was called, and Dr. A. W. Harlan, its chairman, read a report by the section secretary, Dr. George Edwin Hunt, of Indianapolis, in which the uses and advantages of a number of remedies, new and old, were considered.

The first of these was Schreier's preparation of potassium and sodium for sterilizing septic root-canals. The general characteristics, the method of use, and action were described as heretofore detailed in the Dental Cosmos, and in the few cases in which the writer had used it, it had accomplished its purpose thoroughly and well. As to the possibility of violent action forcing septic matter or some of the caustic alkalies through the apical foramen, so far no untoward results have been reported. The taper of the canal and the introduction of the remedy at the larger end tend to cause the products of the chemical action to well up into the crown, rather than pass out through the apical foramen. The preparation promises to be of great value.

The use of sulfuric acid for opening difficult canals, as suggested by Dr. J. R. Callahan, Cincinnati (see Dental Cosmos, April, 1894, page 329, and current issue, page 957), was next described, the writer stating that in his hands the more dilute solutions gave the best results. Referring to Dr. Callahan's belief in the self-limitation of the action, Dr. Hunt stated that in any event but little destruction of dentine would occur, because the small amount of acid used quickly unites with the earthy part of the superficies to form calcium sulfate, which is chemically inert in this situation, and as the acid has disappeared in its formation, disintegration ceases for want of a producing agent. In the root-canal the action is not thus self-limited. The constant churning of the broach scrapes away all insoluble *débris*, exposing normal dentine to the action of fresh acid constantly, and so favoring chemical action until the mechanical act is discontinued.

Of pyrozone, Dr. Hunt said that after a thorough trial it had proved its right to a position of honor in the armamentarium of the dentist. The three per cent. aqueous and the twenty-five per cent. ethereal solutions have developed especial usefulness. As a diagnostic agent in suspected suppuration and as a prophylactic and therapeutic mouth wash the three per cent. aqueous solution is valuable. As a bleacher of teeth the twenty-five per cent. ethereal solution takes high rank. It is also useful as a superficial escharotic application in pyorrheal affections, for which, indeed, it seems almost a specific. All strengths of pyrozone are stimulant to healthy and depressant to diseased tissues.

In milk of magnesia the profession will find an excellent alkaline wash. It is indicated in erosion, hypersensitiveness about the cervices of teeth, and other conditions evidencing excess of acidity in the oral secretions. A teaspoonful in a wineglassful of water makes an agreeable wash for use just before retiring.

Dr. Harlan then read his own report, prefacing the reading with the statement that, in accordance with the idea he had expressed on more than one occasion that there should be some rotation in such positions, he should retire from the chairmanship in favor of Dr. Cassidy, after having held it continuously since the formation of the section.

As an introduction to his report, Dr. Harlan called attention to the fact that prior to 1880, in only one dental college in the United States had dental materia medica and therapeutics been taught by a dentist, while now such chairs are fixtures in all progressive colleges. This change had been largely brought about through the agency of this section stimulating members of the profession to utilize the undoubted value of drugs in the treatment of many diseases of the mouth and peridental membrane, that were formerly treated by mechanical methods or not at all. To-day there is hardly a dentist who does not use drugs in the treatment of all varieties of alveolar abscesses, and diseases affecting the pericementum, the antrum, the pulp, and the mucous membrane of the mouth. While many drugs have been used empirically, and not a few have been proved worthless, the working dental materia medica has been permanently enriched by the labors of dentists, and there are but few who do not understand the properties, uses, and doses of an increasing number of remedial agents. This is particularly true regarding the exhibition of analgesics, hypnotics, sedatives, and internal antiseptics, and other drugs for internal administration.

Two of the most notable drugs used in treating diseases of the peridental membrane are trichloracetic acid and alumnol, both freely soluble in water. Trichloracetic acid, as is well known, is stimulant, antiseptic, and astringent. Alumnol is an astringent and stimulant of great value. After many experiments, the writer has concluded that four to seven grains in one hundred and twenty minims of water, with one or two minims of Ceylon cinnamon added, is best for injections around the roots of teeth. He has used this in some cases daily for two or more weeks, then at intervals of two, three, and four days until the pouches and pockets have been filled with new growths. (The preliminary treatment, of course, includes the removal of serumal and salivary calculi and necrosed edges of the process, and holding the teeth firmly in place.) A dilute solution of trichloracetic acid (one-half to two per cent. in water) is used daily for a week, then the above-mentioned solution of alumnol is persistently used in the majority of cases presented.

In one case of loosening of a superior right first bicuspid, pure wood creasote was used twice a week for eight weeks, with no beneficial results. In another the identical treatment resulted in complete success, no relapse having occurred in seven months. Creolin was used in one case with an absolute cure ; in all other similar cases the result was *nil.*

The use of dilute solutions of silver nitrate is based upon the tendency of this remedy to dry up catarrhal conditions of mucous surfaces. It is styptic and astringent, a stimulant in weak solutions and a caustic when concentrated. In ten to twenty per cent. solutions and upward, it is a destroyer of tissue. It blackens the crowns and roots of teeth, which other agents of even greater value do not do, and on hard structures it leaves a rough body after the blackened surface has exuviated. It is a moderately good bactericide, but, on account of its tendency to produce deep coagulation, it fails, in many places where blind pockets and pouches exist, to reach their uttermost depths, and the infectious spores are not destroyed.

All local medication of diseased tracts around the teeth must be based—when not caused by the administration of drugs—on the theory that the disease has been brought about through the agency of micro-organisms, sometimes following local injuries to the gingival margins, or other accidents from external causes. In all cases of not clearly distinguishable local origin, the administration of tonics, alteratives, and internal antiseptics is indicated. Five-grain doses of potassium iodid, three times daily after meals, in syphilitics in the tertiary and later stages, is more beneficial, if continued for two or three weeks, then a rest of a week, and then beginning again, in the absence of gummatous formations, than ten or twenty grains or more, and less irritating to the stomach.

The report then urged the systematic use in large quantities of pure drinking-water, as all mucous surfaces are benefited, and glandular activity is thereby invited to such a degree that many poisons of bacterial origin are gotten rid of through the excretory organs.

One factor in the treatment of pyorrhea alveolaris is gum-massage by the patient, who is directed to rub the gum twice daily for five minutes with the finger or a rubber pad, using

℞—Lanolin, ℥ i ;
Boracic acid, gr. xl.

with a few drops of some essential oil, as Ceylon cinnamon, added to give piquancy to the taste ; this to be continued during treatment and for a month afterward. A tendency to bleeding of the gums will cease after a few days of this treatment. The writer adds occasionally twenty grains of tannic acid.

The report concluded with the hope that no one fails to comprehend the absolute necessity for cleanliness of mouth, teeth, and skin during the treatment of such cases, and that remedies cannot be used successfully in pouches or pockets unless injected through a syringe having a delicate gold or platinum point.

Dr. J. S. Cassidy, Covington, Ky., wished to call the attention of the association to a preparation made by Schering, of Berlin, and known as "formalin." He had been experimenting for some months in the direction indicated by Professor Miller, of Berlin, of finding something to permanently sterilize the contents of inaccessible portions of root-canals. Formalin is not a secret nostrum ; its composition is well known, as also the method of its manufacture. It consists of an aqueous solution of formaldehyd, which is the aldehyd of methyl alcohol, the typical acid of which is formic acid ; hence the name. Pure formaldehyd is a gas, having the formula CH_2O, and approximately the same density as the atmosphere. It is readily absorbed by water, from which it also escapes readily, more especially with increased temperature. As it escapes it may be absorbed by certain solid, porous, or fibrous substances, as muscular tissue, dentine, silk, cotton, linen, etc. When condensed in these solids, it solidifies itself, from which form it escapes more readily and with more energy than in the ordinary condition, and it generally either abstracts oxygen, forming the typical acid, CH_2O_2, or unites with nascent hydrogen, going back to its original starting-point of methyl alcohol, CH_4O.

So far as its practical application is concerned, there has not been sufficient time since its introduction to determine absolutely its effect in the mouth. Muscular tissue it cooks completely by one immersion. It does not coagulate albumen, as does mercuric chlorid, temporarily, but combines with it, forming a homogeneous mass, which, when dry, resembles horn, being hard and insoluble, and, to all appearances, permanently sterilized. The yolk of an egg is cooked, retaining its form, and having about the same consistence as when hard-boiled, except that the sulfur is not expelled. It is not a poison, as commonly understood, though it is not intended for internal use. It does not corrode the instruments, nor has it a bad taste or odor. A solution of one to two parts per thousand sterilizes,—that is, it will destroy the most persistent micro-organisms. A one to three per cent. solution will disinfect any culture or any decomposing fluid so far experimented with, as pus, broken-down pulp-tissue, decomposing blood, etc. The literature so far seen suggests its use with certain porous substances which absorb it readily. Any dentist can make a combination of plaster, sand, and pumice into little cakes, which when dried will absorb formalin, and, thus charged and placed in the instrument-drawer, will keep the contents perfectly sterilized, provided they are disinfected before. It is yet too soon to determine what the action will be in inaccessible root-canals.

The subject was passed.

Dr. A. Boice, Philadelphia, presented a paper by Dr. W. N. Morrison, of St. Louis, on "Bridges," which he asked to have read by title as a part of Section I's report.

Dr. S. H. Guilford, Philadelphia, wished to call up the subject of pathology, in order to have brought to the attention of the association a remarkable case of hypertrophy of the pulp, which was presented before the Odontological Society of Pennsylvania by Dr. J. Howard Gaskill, of Philadelphia.

The privilege being granted, Dr. Gaskill said that the patient referred to presented about two and a half years ago with a pink spot on one of the central incisors, which could be seen distinctly through the labial or lingual wall. There was no external opening. He waited developments, thinking possibly it might heal spontaneously, as it had apparently come without irritation or pain. In six weeks the patient again presented, with the palatal wall of the tooth crushed in by mastication. On removing the pulp it was found that absorption had progressed so far that the enamel-wall was thin enough to allow the instrument to be seen through the labial wall. The cavity was filled with oxyphosphate, and the patient had no further trouble till this last spring, when he came again with a similar affection in the other central. This time the case was shown to several other dentists in Philadelphia, among them Dr. Kirk, who suggested a systemic treatment consisting of iodid of arsenic and

Fellows's hypophosphites, and, remarkable to say, the pulp is assuming its normal condition, is possibly depositing secondary dentine, and the spot is hardly discernible. The patient is a colored boy of about twenty, and perfectly healthy. His blood was found by microscopical examination to be in a normal condition. He would be glad to have some light on the case. Dr. L. Foster Jack has had a similar case since.

Dr. Louis Jack, Philadelphia, has observed two such cases, the first when a student over forty years ago, in the practice of his preceptor, and the second within the past three months, in the practice of his son. In this latter, a large amount of dentine had been resorbed, the point of closest approach to the outer wall being at the inner mesial aspect, and the destruction reaching to a little above the margin of the gum. His son did not consult with him, but drilled into the pulp-tissue at the nearest point, destroyed the pulp, and filled the upper portion of the pulp-chamber and the root-canal with gutta-percha, and the cavity with phosphate of zinc. Except for what has been described, the tooth was sound in every respect, and had had no previous treatment. He had also seen the two cases reported by Dr. Gaskill, and noted the pink spot described.

Dr. Frank Abbott, New York. This makes some five cases of this particular form of absorption of the inner portion of the dentine from the pulp reported from Philadelphia. He had never seen any such cases reported from anywhere else, or anything resembling them. There are only two ways of accounting for this condition. Either there must have been an opening for the entrance of an acid, or there must have been some irritation of the pulp to cause the absorption of the tooth itself. How an irritation could exist in the pulp sufficient to affect the dentine about it, or how the lime-salts could be carried away without causing the death of the pulp, is a mystery. The dentine must be destroyed in a manner similar to the absorption of the roots of the temporary teeth. What could cause such an irritation of the pulp is the question. If it occurred in the manner stated, it would seem to be an irritant in the circulatory movement; but in that case he could not see why the bones of the patient should not be destroyed and be left limp. Here is a case of a substance harder than any bone-tissue, destroyed in large quantities, without any external opening, without the presence of any acid, and apparently without any irritation sufficient to cause the death of the pulp.

Dr. John S. Marshall, Chicago, had expected that Dr. Abbott would explain the case very easily on the theory of retrograde metamorphosis which he advocates. It does not seem any more difficult to understand than the absorption of the roots of permanent teeth occasionally by the osteoclasts. May there not have been osteoclasts in the pulps of these teeth?

Dr. Abbott replied that as he understood the resorptive process in bone-tissue, there are no such things as osteoclasts which break down the tissue. That is simply a process of irritation by which the lime-salts are thrown down and carried away; the same process, only retrograde, by which the tissue was built up. There is no other way in which it can be done. The little mass of medullary tissue often found at the end of a temporary tooth when extracted, consists of multinuclear bodies which are supposed by many to have the peculiar function of dissolving out the lime-salts. He does not conceive that there is any such thing. You simply have a return to the original condition through an irritant attacking the pulp and causing the lime-salts to be carried away. He had never heard of such cases outside of Philadelphia. It may be that there are conditions there, as elsewhere, tending to produce certain forms of disease. He could not conceive of anything to produce this irritation, unless we go back to some specific poison at work on this organ confined in the tooth.

Dr. Marshall rejoined that until he had some better understanding of the matter, he should stick to the osteoclasts. We can't tell what started the irritation. It may have been a blow or a cold.

Dr. Abbott. Will Dr. Marshall explain what is an osteoclast, and where it comes from?

Dr. Marshall did not know where it came from, but it is found and it does its work.

Dr. Gaskill. Dr. Jack suggested that osteoclasts were the cause; but now that we have obtained a cure it hardly seems that that can be so.

Dr. Marshall saw no difficulty in that. The osteoclasts do not necessarily keep on with their work until they destroy what they attack. We often find where they have scooped out a large portion of a root and then stopped, because the irritation had subsided, and the cementoblasts had gone to work to rebuild the tissue.

Dr. B. Holly Smith, Baltimore, was reminded, by Dr. Abbott's failure to understand the phenomenon, of a story told by the late Henry W. Grady, of an old preacher, the leaves of whose Bible had been pasted together by some bad boys. In reading the lesson, he began, "And Noah took unto himself a wife, and she was"—here he turned over the leaf—"fifty cubits broad and three hundred cubits long, and tarred inside and out with pitch." The old man read it again, and said he, "My brethren, I have never read this passage of Scripture before, but I believe everything that is within this book. It is only another evidence that man is fearfully and wonderfully made." So it is possible that we cannot understand all the phenomena. Under the circumstances, he would suggest that, as these cases all seemed to occur in Philadelphia, their solution may possibly be found in a degeneration of brotherly love.

Dr. S. B. Palmer, Syracuse, N. Y., would suggest that we are first to consider how these organs are built up. All animal bodies are built up on what may be called the negative side, opposite to acids. When any perversion occurs, or the circulation is cut off, all that is necessary to present what was seen in these cases is for nature to undo what has been done. It does not require any outside exposure, but when the current that went to build up and fortify is turned back, it takes the lime-salts back into the system. Sometimes, as you all know, gold fillings, after years of service, have to be removed because of irritation beneath them. There may be no decay, but the irritation sometimes is great enough to produce absorption of the lime-salts, in which event the destruction of the pulp may follow. Sometimes a clasp may cause irritation on one side and produce a deposition of lime-salts, or fill up the pulp-chamber,—that is, in the case of a slight irritation. In an ordinary cavity, we have something which nature does not attempt to remedy, because it is acid, the opposite of what nature used in building it up. If we put in a non-conducting material, or stop the irritation, nature will go on, as under gutta-percha, to fortify and build up, so that we may produce the proper filling in time. There is nothing mysterious about it if we can only follow the law from the chemical action up to the organic body, and see the workings of nature in producing the current which goes to build up, and which may reverse and take down.

In the case of the teeth reported, presenting spots upon the surface, in the one there was destruction ; in the other it was counteracted by systemic treatment. Perhaps the remedies administered restored nature to a condition to produce that effect. When that is done, we have good results. Nature knows when it is time to absorb the lime-salts in the roots of the deciduous teeth, and give place for their incoming successors. The whole of the business comes in the reversal of nature's process. Nature builds up on the alkaline side, and when there is reversal then it is the acid.

Dr. Jack. It seems remarkable that all these cases occurred in Philadelphia, but there is no question as to the authenticity of the four reported, as the observations were distinct and certain. In Dr. Gaskill's cases there was perfect symmetry,—that is, the lesion occurred at the same portion of the labial and lingual surfaces of both teeth. In the case in the care of the speaker's son, it was more to the mesial aspect. There was an enormous cavity, extending considerably beneath the gum, and involving the lower portion of the crown. He did not know whether there had been any previous irritation in this case, nor whether it presented the same degree of redness as those reported by Dr. Gaskill, where the color was extremely marked. The cavity was regular,—that is, it had no bay-like excavations, but was clearly defined, almost as if made with a round burring instrument.

Dr. J. Y. Crawford, Nashville, Tenn. All the cases of such phenomena are not confined to Philadelphia. He questioned the propriety of saying that the pulp had hypertrophied, and was inclined to think that the phenomenon could be accounted for by saying it was a pulp-transformation ; in other words, that the pulp, instead of continuing to be a tooth-builder, gets to be a tooth-resorber or remover. He was satisfied that if a careful clinical history could be obtained, it would be found that there had been some local injury or a constitutional trouble which impressed the organism at that point, resulting in the change he had referred to. Living in the city of Memphis is a gentleman who lost the roots of the superior right second molar by this process. He had seen such phenomena in more than one instance. In the examination of the case just referred to, the teeth, including the particular one specified, appeared to be in good condition. Of this particular tooth the patient reported slight discomfort. In exploring around the gum and roots, the instrument slipped into an opening on the buccal aspect, which gave a little pain, and he supposed that gingival decay had exposed the pulp, but further examination showed that the entire root-end of the tooth was devoid of bony tissue. A dentist friend said the tooth was deciduous, although it had all the characteristics of a permanent tooth, and had erupted at the right time. That was seventeen years ago. Last winter the tooth was as perfect above the gum as any other tooth in the mouth.

He felt sure that the condition referred to does not occur where the entire tissue of the tooth is thoroughly or markedly necrotic.

Dr. Gaskill stated that he had been unable to find that there had been any irritation whatever. The teeth had not the slightest soreness, and were not unusually responsive to heat or cold, indicating a normal condition of the pulp. In the tooth from which he removed the pulp, the canal was not markedly increased in size, though the apical foramen was slightly enlarged. The pulp was very vascular, and there was some difficulty in stopping the hemorrhage when it was removed. A styptic was inserted, and the next day the operation was finished.

Dr. Louis Ottofy, Chicago, was not satisfied that the idea of osteoclasts in this case was reasonable. While some who have investigated claim that there is such a thing, no one has ever seen an osteoclast. There is no doubt that the peculiar conditions which lead to the absorption of roots of teeth cause a theory to be devised to explain them, and we have the theory of osteoclasts. He could see no necessity for them. The blood-stream is a sewer as well as a channel of nutrition, and why cannot the particles which are destroyed be removed through it as well as by specially formed osteoclasts? We know that the red corpuscles, as well as the white, almost always have particles attached to them. There is no reason why the dentine in the cases cited could not have been removed in the same way it was deposited. It is no harder, when taken particle by particle into solution, than any other substance. It is not unreasonable to suppose that some irritation caused enlargement of the pulp, the enlargement resulting in pressure and the pressure leading to solution, the particles being carried away in the blood-stream without the intervention of osteoclasts or odontoclasts.

Dr. T. T. Moore, Columbia, S. C. This kind of cases was touched upon in this body more than ten years ago by the late Dr. Atkinson. The speaker had a similar case, in a gentleman forty-five or fifty years of age, one of those rare specimens in whose teeth we find no decay. His teeth were without a single filling. After several years, having in the mean time had his teeth examined a number of times, the gentleman came, saying that there was something wrong with his teeth, as he felt a desire to grind and crush, which annoyed him. The teeth were examined thoroughly with the electric light, but no disintegration was found. The difficulty was between the lower right first and second bicuspids,—which, could not be told. After a while the patient came in again with one of these teeth crushed in, and the other so softened that it cut like cold mush. Dr. Atkinson said the trouble was caused by liquefaction of the dentine, and the only remedy was to kill the pulp. He has had to do this with five of those teeth, and these are the only filled teeth in that mouth to-day. He did not know whether there was any local cause for the trouble, or any systemic cause. Recently the gentleman had been unable to pare his finger-nails without tearing them into the flesh, and had to use a file. There may be something systemic connecting the two. You will find in the Transactions of this association that Dr. Atkinson spoke on this very subject some ten or twelve years ago.

Dr. Abbott. Dr. Gaskill, in his last remarks, gives perhaps a pointer. He says that the foramen was enlarged and that there was considerable hemorrhage. Whether the enlargement of the foramen occurred before or during the destructive process, of course cannot be known, but it is natural to suppose that the opening was enlarged to start with ; that there was then a larger flow of blood to the pulp than was normal ; that it was thus over-nourished and, consequently, over-irritated, and so it became an irritant and dissolved, liquefied, or decalcified the dentine itself.

Dr. Jack. A fact which throws some light on these cases is that in all the three late ones the structure was of low grade, as is common in the colored race. An incident which he recalled, as probably similar incidents had occurred in the practice of others, may have some bearing on the explanation of these cases. On removing a defective amalgam filling which had been inserted by another dentist in an inferior third molar, he found that not all the carious matter had been removed. After it was taken away, he found a large deposit of secondary tissue. He then filled the cavity with some temporary material. After some years, owing to some irritation, showing that the pulp had become devitalized, he removed the filling, and found that the whole of the secondary dentine had been resorbed.

Dr. C. N. Peirce, Philadelphia. Some of those present might recall that some five or six years ago, at a meeting of the State Dental Society of New York, he had reported the case of a lady who had been in his charge from childhood. Having been anemic for several years, she complained of neuralgia radiating from the superior centrals, which had been filled with gold for several years. He removed the fillings, which were quite superficial, and found both the pulps exposed, and the pulp-chambers were more than double their normal size. The pulps were devitalized and removed, and the teeth filled, when the pain passed away. No other teeth were affected. Why those two should have been the seat of the trouble he could not say, but there was decalcification until the thickness of the dentine was reduced to a minimum.

President Patterson had seen cases similar to those which have been spoken about, but he had satisfied himself that the condition came from imperfect enamel and dentinal structure, and that the irritation came from without and not from the circulation. Although ordinary examination will not show any imperfections, after the tooth is extracted and sections made, abnormal channels can be found running through the dentine to the pulp which has been irritated, and in the enamel that imperfect structure which has allowed the irritation, which has then gone on in the same way caries does.

Dr. H. J. McKellops, St. Louis, wished to ask the gentlemen present how they diagnose ossified pulps. There is a great deal of suffering from that cause. He recalled particularly a case which happened in Dr. Shepard's office, in Boston, while he happened to be there. The patient, a lady, was suffering excruciatingly, but her teeth on examination were beautiful, and no one could tell what was the matter. At last, Dr. Shepard extracted a tooth which he suspected of being the cause of the trouble. Its pulp was found calcified. The youngest person in whom he had seen this condition was ten years old, the tooth a first molar, a good many years ago. He would like to know how to tell when this condition existed, as it has caused a great deal of suffering, for the why and wherefore of which he had never heard any reasons given.

Dr. Crouse also would like to know how to diagnose these cases without drilling into the pulp. For one patient he had extracted four teeth, one after the other, for two of them being called up in the middle of the night because the patient could not stand the pain longer. In all of these, the pulp-cavity was nearly filled up. The only rule he could lay down for the diagnosis of this condition was a process of exclusion. When he cannot find anything else to explain it, he concludes it is ossification. When the pain is reflex, distributing itself over the mouth and head, it is very difficult to locate the trouble. If one tooth is more sensitive than the others, he tells the patient to watch the next time the pain is coming, to see if he can locate its starting-point. He has a patient who has three teeth with calcified pulps, and there is probably another, but which one it is he does not know.

Dr. T. W. Brophy, Chicago, thought that the incandescent electric light would nearly always make a distinction between a tooth which has a calcified pulp and one which has not. He had found it a great help and very efficient in these cases. With the room darkened, the light will show a certain degree of opacity in the tooth so affected, different from those in normal condition.

Dr. Marshall believed the diagnosis of these cases to be among the most difficult in dental practice. He knew of but one way,—that sometimes used by physicians in getting at obscure diseases,—the process of exclusion. If it is nothing else, it must be that. You don't want to drill unless you are entirely sure which tooth is giving the trouble. Usually the pain is reflected all over the side of the face, and the patient cannot tell where it starts. Sometimes he will say a certain tooth feels a little big; but the only way to get at it is by this process of exclusion. But you must make a distinction here. A peripheral calcification does not cause pain; it is the formation of pulp-stones which causes the trouble, by the lateral pressure upon the nerve-filaments of the pulp. The first is found in old people; the second usually in young people just arriving at maturity. The pain is paroxysmal, and running or rapid walking, or bending over suddenly, will start a paroxysm. This can be tried in the office when this condition is suspected.

Dr. McKellops had tried the electric light, but had never been able to learn anything in that way.

Dr. Abbott. All these cases present something mysterious, and he would ask those present to think the matter over and try to get back to the origin of the trouble, to what causes ossification of the pulp, and be ready to talk about it next year.

Dr. Peirce presented a report from the Executive Committee, approving the appropriation of five hundred dollars to the World's Columbian Dental Congress, with the proviso that the first moneys received from the sale of the Proceedings after the bills have all been paid shall be applied to reimburse this association until the entire appropriation shall be cancelled.

The Executive Committee also reported that in accordance with the instructions of the resolutions offered by Dr. Harlan, they had selected as the subjects for the general addresses next year, "Antiseptic Surgery,'' Dr. A. W. Harlan, essayist, and ''The Practice of Dentistry,'' Dr. Louis Jack, essayist.

The association then proceeded to the selection of the next place of meeting and the election of officers, which have already been reported in these pages.

A vote of thanks to the railroads, hotel, and steamboat companies, for courtesies rendered, was adopted; as also a vote of thanks to the retiring treasurer, Dr. A. H. Fuller, who declined a re-election, for his efficient services through many years.

Dr. J. Y. Crawford, the newly-elected president, was then installed, and briefly returned his thanks for the confidence bestowed upon him, concluding his remarks with an invitation to the members and their friends to a sail upon the bay at three o'clock in the afternoon.

The secretary was authorized to appoint chairmen and secretaries or any of the sections which had failed to organize.

The president announced the appointment of Drs. Harlan and Darby as members of the Publication Committee.

[The local committee of arrangements has been appointed since adjournment as follows: Drs. C. A. Meeker, C. S. Stockton, C. W. Holbrook, all of Newark, N. J.]

The association then adjourned to meet the first Tuesday in August, 1895, at Asbury Park, N. J.

WOMAN'S DENTAL ASSOCIATION OF THE UNITED STATES.

THE Woman's Dental Association met at Dr. Maria Lasser's office, 1602 Arch street, Philadelphia, Pa., November 3, 1894; Vice-President Dr. Elizabeth A. Davis in the chair.

Dr. J. Foster Flagg discussed at length Dr. Mascort's article in the May DENTAL COSMOS, on ''Salol in Filling the Roots.''

The next meeting will be held at the office of Dr. Eliza Yerkes, 4004 Chestnut street.

EMILY W. WYETH, *Recording Secretary.*

DENTAL SOCIETY ANNOUNCEMENTS.

JOINT MEETING AT PITTSBURG.

THE Lake Erie and Pittsburg Dental Societies will hold a joint meeting at Pittsburg on Thursday and Friday, January 23 and 24, 1895. The State Executive Committee will meet at the same time and place.

A cordial invitation to attend is hereby extended to all who are interested.

J. A. LIBBEY,
524 Penn avenue, Pittsburg.

CONNECTICUT VALLEY DENTAL SOCIETY.

AT the thirty-first annual meeting of the Connecticut Valley Dental Society, held at Springfield, Mass., October 25 and 26, 1894, the following officers were elected for the ensuing year: Dr. C. C. Barker, president, Meriden, Conn.;

Dr. W. O. Barrett, vice-president, Ware, Mass.; Dr. D. A. Jones, vice-president, New Haven, Conn.; Dr. Geo. A. Maxfield, secretary, Holyoke, Mass.; Dr. A. J. Cutting, assistant secretary, Southington, Conn.; Dr. F. R. Rice, treasurer, North Adams, Mass.

GEO. A. MAXFIELD, *Secretary*, Holyoke, Mass.

SAN FRANCISCO DENTAL ASSOCIATION.

AT a meeting of this society held October 8, 1894, the president, Dr. C. L. Goddard, presiding, the annual election of officers for the ensuing year was held, resulting as follows: Dr. C. E. Post, president, 14 Grant avenue; Dr. F. C. Pague, vice-president, 819 Market street; Dr. G. N. Van Orden, secretary, 14 Grant avenue; Dr. H. G. Richards, corresponding secretary, 931 Sutter street; Dr. W. A. Knowles, treasurer, 118 Grant avenue; Dr. J. E. Cummings, librarian.

H. G. RICHARDS, *Cor. Sec.*

AMERICAN DENTAL SOCIETY OF EUROPE.

DR. J. H. SPAULDING, 4 Rue de Rome, Paris, has assumed the duties of secretary to this society, in lieu of Dr. Wm. Davenport, who has been obliged to decline serving.

DISCLAIMER.

IT having come to my knowledge that a certain method of painless dentistry is being advertised by the use of my name, professional friends will please take notice that I never used the method, nor gave a testimonial for a method or patented appliance in my life.

GEORGE O. WEBSTER.

St. Albans, Vt., November 19, 1894.

EDITORIAL.

STOMATOLOGY.

THE recent organization in Philadelphia of a society composed of dental practitioners under the title, Academy of Stomatology, has given rise to some comment and not a little criticism regarding the new designation. The use of the term stomatology, though a word of comparatively recent introduction, is not without precedent. In Paris the Société de Stomatologie has been in active operation for some time past, and their transactions are regularly published in their official monthly organ, the *Revue Mensuelle de Stomatologie.* The word has its Spanish form represented by the *Revista Estomatológica,* published in Madrid. So far as we can learn, the fitness of the term to express its meaning has not been publicly called in question, excepting in a single instance,—viz, in an editorial in the September issue of the *Pacific Coast Dentist.* Respecting the term the editorial says, "The word is from the Greek *στσμα*, a 'mouth,' and *λσγος*, a 'discourse,' " by which it is probably meant that the word is derived from *στόμα*, a mouth, and *λόγος*, a discourse. The writer then says, "A stomatologist is, therefore, one versed in the science and functions of the mouth." Notwithstanding this perfectly clear grasp of the meaning of the term, the editorial offers the following objections and comment upon the proposed adoption: "There are many reasons why the term stomatology should never gain any place in dental nomenclature, the first and chief one of which is, it cannot etymologically supply the true meaning. *Στσμα* [*Στόμα*], the root word, has already been borrowed to make the word stomach, and, in reality, the root is more fitted for the coining of this word than for the outlandish use some would ask us to put it to. Stomata (plural) is also applied to the minute orifices in the epidermis of leaves through which exhalation takes place. The original meaning of the true Greek word, as near as it can be translated, was a breathing pore. Later it was understood to mean a small orifice by which plants and lower animals are enabled to be nourished.

"The human and animal mouth is an aperture for the reception of food for the body, and in which, by its peculiar apparatus of nerves, muscles, bones, taste, suction, mastication, deglutation (*sic*), it is prepared and further introduced into the alimentary tract. Respiration is also exercised and speech is performed by organs contiguous. In the word *stoma* no such real meaning is found. If the term dentist is not sufficient, let it be that which has already gained some standing, 'oral surgery,' which includes all." The motive which the critic imputes for the introduction of the term stomatology is set forth in the following: "The only excuse, aside from the desire to originate and change nomenclature, is, if possible, to do away with the name dentist. That word is hateful to some; it hasn't a professional ring."

As to the etymological incorrectness of the word, our contemporary is clearly in error. The root *στόμα* means literally the mouth, as of men and animals. It is used strictly in this sense throughout the New Testament, and while it is quite true that it has been borrowed to "make the word stomach," as well as a number of other words of related meaning, we know of no law granting a monopoly of a Greek root to a limited number of its derivatives. Stoma, like numberless other terms, has a variety of secondary meanings, but its use to designate the mouth is its principal signification.

So far as its etymological fitness is concerned, there can therefore be no question. The statements advanced by the critic to show the inaccuracy of the term are clearly out of line with his own definition that a stomatologist is one who is versed in the science and functions of the mouth. We may add, also, that there will probably be no attempt made—certainly not a successful one—to "gain a place for the term in dental nomenclature,'' for, inasmuch as the greater always includes the less, the only relationship of this kind possible with respect to the two terms would be to gain a place for the words dentist, dental, etc., in stomatological nomenclature. The only reasonable motive for adopting the new word must be the need for a term which shall more accurately express all that is now included in our knowledge of the mouth, its functions and its care in health, and its treatment when diseased. Does such a need exist? Those who study the development of dental knowledge, and who are at all familiar with the progress that has been and is being made, can have no doubt that the boundaries which formerly contained all that was known of dentistry have been immensely broadened. If the field of the dental practitioner could have been definitely limited to the study of the teeth, and if that study had not led him into the investigation and knowledge of their systemic relationships, there would have been no need for any more comprehensive designation of his calling. But by the same forces through which dentistry has evolved from an empirical art to a distinctly scientific calling, so has its field of operations enlarged, until it is now generally conceded that the dentist who has not a fair working knowledge of general pathology and physiology, anatomy, chemistry, and therapeutics, is not competent to intelligently practice his profession.

We have frequently pointed out what we believe to be a fact,—that the treatment of the whole oral cavity, its contents and its adnexa, should be included within the field of operations of the properly trained dentist. It is a territory which is already accorded to us, if not openly, at least tacitly, by virtue of the fact that concerning it the medical profession, as a profession, practically makes no pretense of knowledge, and it is being rapidly included within the practice of dentistry more completely.

It is the recognition of this state of affairs which has created the demand for a term which shall more accurately describe the conditions as outlined, and as now existing.

With perhaps a single exception, no other word in the English language will meet the requirements. The term proposed by Dr. Williams, of Boston,—viz, oristry,—more nearly expresses the conditions than any other, with the exception of stomatology. The latter should have preference, because it is a natural member of a large class of allied terms already in use,—*e.g.*, laryngology, ophthalmology, gynecology, rhinology, otology, etc., which designate departments of medical practice which are the strict analogues of what is now properly included in modern dental practice.

Respecting stomatology Professor Miller has said: "Stomatology, or that branch of medical science which has to do with the diseases of the human mouth and their treatment, is perfectly entitled to stand on an equal level with the other specialties of medicine: otology, ophthalmology, etc.''

We regard the adoption of the term stomatology as the mark of a distinct professional advancement in our profession, and when such a step is taken by a body of intelligent practitioners we feel that it should receive commendation and not ridicule from those whose carelessness or lack of knowledge of existing circumstances renders them incompetent to pass judgment in the premises.

Another feature of the organization in Philadelphia which has adopted the new term is worthy of more than passing notice. An avowed purpose of the Academy of Stomatology is the creation of a fund to be used in securing a permanent habitation, where a complete dental library and reading-room as well as a museum may be established, which are to be accessible at all reasonable times to the members. Rooms for meeting purposes and for clinical demonstrations are also to be provided.

This is a step in the right direction, and of the utmost importance. It is a discredit to dentistry that so little has been done toward providing for the care of its books, specimens, etc., in such a manner that they may be consulted and studied by any member of the profession under proper restrictions. Medical libraries and museums are established and are accessible in nearly all of our large cities, but one looks in vain for similar dental institutions.

If dental professional *esprit du corps*, of which we so frequently hear, could be stimulated only to the extent of devoting to the requirements of the commonweal a portion of the money that is annually wasted by dentists in less worthy channels, we could have had long ago, if not a national dental library and museum, at least local ones which would be an honor to us. The incorporation of this feature as one of the factors in the organization of the Academy of Stomatology is a most encouraging fact, which we sincerely trust may bear fruit in the way of not only demonstrating the feasibility of the idea, but of encouraging similar attempts throughout the country.

A WAIL FROM THE WASTE-BASKET.

WE have never before been called upon to publicly give the reasons why we felt it necessary to reject an article offered for publication in the DENTAL COSMOS. Dr. Charles N. Taft, in the August number of the *International Dental Journal*, under the title, ''Reply to Editorial in the DENTAL COSMOS,'' sets forth that he prepared a paper entitled ''The Philosophy of the Homœopathic Law of Cure, and the Advantage to the Dentist of a Correct Understanding of its

Application,'' which he submitted to the DENTAL COSMOS that it might be ''published broadcast for the benefit of his colleagues''; that the paper was returned to him because it was ''not considered available for the purposes of that journal,'' and that the paper was subsequently published in the November, 1892, issue of the *International Dental Journal.*

All of which we admit is a perfectly true statement of the facts. The author of the paper in question, in his ''reply,'' implies that we have been in this instance faithless to our trust as embodied in the motto on our title-page, in which we announce that the DENTAL COSMOS is devoted to the interests of the profession, and as Dr. Taft says, ''whose columns it is given out, editorially, are always open for the publication of papers reporting the results of original work, and yet declining at times to publish such papers when offered.'' He says further, ''It is known to many that my work in this direction has been conducted always with the one single purpose of adhering strictly to the homœopathic law of similars as laid down by Samuel Hahnemann,'' etc., etc. He then asks for an open definition of what constitutes a report of scientific study ''in its application to the acceptance or rejection of papers that modestly claim to be scientific.'' ''It would furnish at least a common ground of understanding between editors and dentists as to what really constitutes dental scientific work, and what course must be pursued with the DENTAL COSMOS from now on before the result of such investigations can be published in the broadcast manner advocated by its editor.''

The closing utterance of this interesting communication is an axiom with which even the immortal utterance of Hahnemann cannot compete in point of accuracy,—viz, ''There are journals and journals; some that are unquestionably devoted to the interests of the whole profession, others that are only apparently so.''

Our reason for refusing to publish the paper of Dr. Taft is simply that the article, in our judgment, is lacking in the first essential of a scientific study, and has not the remotest relation to the scientific method in its make-up. It is a case of reasoning upon internal evidence, the beauty of which method is inherent in the process rather than in the results. There is a wide difference between original work and original scientific work. The latter we never refuse. The one sole object of the scientific method is to arrive at the facts; its spirit is the spirit of truth-seeking. The avowed purpose of Dr. Taft's work is best expressed in his own words when he says, ''My work in this direction has been conducted always with the one single purpose of adhering strictly to the homœopathic law of similars as laid down by Samuel Hahnemann.'' The law of Hahnemann is not a law of nature, but an *ipse dixit* which Dr. Taft accepts as the equivalent of a natural law, and hence regards his observations respecting it as scientific observations. It is his avowal of adherence to the so-called law of Hahnemann that stamps his work as unscientific. The scientific observer does not at the outset proclaim adherence to any dogma; his sole animating motive is to discover the truth. A paper based upon a false major premise is in consequence erroneous in its deductions and conclusions. The rejection of the paper in question was not influenced in any degree by the personal views of the editor of the DENTAL COSMOS with respect to the merits or otherwise of homœopathy as applied to dental treatment, but was solely on the ground that the paper, while claiming to be a scientific production, advertised upon its face that it was not what it purported to be.

We have more nearly at heart the "interests of the profession" than may appear to a writer whose paper has been returned to him, for which reason we feel that the said interests are more fully conserved by protecting our readers, so far as it may be in our power, from the infliction, not to say imposition, of spreading before them literary productions which are conceived in error, elaborated on false or insufficient premises, and which in their central motive are the antithesis of what is either practical or scientific. We are obliged to Dr. Taft for recognizing that there are journals and journals; also that some are unquestionably devoted to the interests of the whole profession, while others are only apparently so. As to the others,—well, we are concerned at present with the DENTAL COSMOS, and we propose to continue devoting its space and influence to furthering the interests of the whole profession; no small part of which work consists in eliminating such material as does not help to that end.

BIBLIOGRAPHICAL.

A COMPEND OF DENTAL PROSTHESIS AND METALLURGY. By GEO. W. WARREN, D.D.S., Chief of the Clinical Staff, Pennsylvania College of Dental Surgery; author of "A Compend of Dental Pathology and Dental Medicine;" editor of "Richardson's Mechanical Dentistry," etc. With one hundred and twenty-nine illustrations. Philadelphia, P. Blakiston, Son & Co., 1894. Price, cloth, $1.50.

We have many times expressed our opinion of the class of publications known as compends. They are useful works strictly within the limits of their field of application. The danger respecting them is that they may, with a certain type of student, be used to take the place of more exhaustive treatises, and so furnish the basis of an incomplete educational result. As aids to memory and as guides to study they are to be commended, especially under conditions of limited time on the part of the student. That the field of dental prosthesis and dental metallurgy could be brought well into view within the compass of two hundred and sixty-two 12mo pages would seem to be a practical impossibility, but a careful inspection of Dr. Warren's compend shows that it can be done. By an intelligent and withal expert use of descriptive language, the salient points of both topics have been clearly given. The whole work bears evidence of the author's experience and training as a teacher. Especially is this manifested in the lucidity with which the various points are set forth, so that they may be readily understood by the novice.

While the work can in no sense be considered as a text-book, or fulfill such a purpose, it should be a valuable aid to the new student, to whom we would heartily commend it.

Descriptive Anatomy of the Human Teeth. By G. V. Black, M.D., D.D.S., Sc.D. Third edition. Published by the Wilmington Dental Manufacturing Company, Philadelphia, Pa. Price, cloth, $2.50.

We have noticed at length the preceding editions of this standard work. At first a pioneer in its field, it has since maintained, by virtue of its own merit, the position of a classic on the subject of which it treats.

A few improvements have in this edition been made in the descriptive text, and a few changes in nomenclature,—viz, the introduction of the word axial, and the two new forms, *occlusal* instead of *occluding*, and *incisal*, in compound forms. The systematizing of the names of the angles of the teeth has been completed. The work fully deserves its well-earned popularity as a text-book.

Pamphlets Received.

Proceedings of the National Association of Dental Faculties. Eleventh annual meeting, held at Old Point Comfort, Va., August 4, 6, and 7, 1894. Constitution and Codified Rules. Chicago. Published by the Association, 1894.

Cauterization of the Nares and Accidents that may Follow. By E. Fletcher Ingalls, A.M., M.D., Chicago. Read before annual meeting of Illinois State Medical Society, Decatur, May 15 to 17, 1894.

Fell Method of Forced Respiration. By George E. Fell, M.D., F.R.M.S., President American Microscopical Society, 1890, etc., etc., Buffalo, N. Y. Read before Section General Medicine, Pan-American Congress, Washington, D. C., September 7, 1893.

PUBLISHER'S NOTICE.

THE DENTAL COSMOS AND ITS SUBSCRIBERS.

THIS issue of the DENTAL COSMOS closes our contract with subscribers for the XXXVIth volume, and we trust that our part has been so performed that every subscriber will feel it a duty to himself and his patients to continue the arrangement. We are ready to renew our contract with each of them to furnish him for 1895 the best dental journal published. Our signature to a receipt for the subscription price is a contract on our part to that effect.

Let us emphasize one point. The DENTAL COSMOS is not published "for fun," nor is the first object of its publication the circulation of its publisher's advertisements. If either of these was the primary object of its existence, its subscription books would be so managed that a name once on them would be kept there, and the journal be sent continuously to the rejoicing recipient, whether he paid for it or not.

But that is not our way. We produce a dental journal which is of greater value to the earnest, progressive dentist than any other, probably than all others combined. We produce it in a style unapproached by any other, and we put a low price upon it to bring it within the reach of every man practicing dentistry. Having done this, we tell the dentist of it and ask for his support. We will not force the journal upon him, will not send it to him unless he signifies a wish to receive it by subscribing and paying for it.

We carry this principle into renewals, which is the point we emphasize. If you want your subscription renewed, you must tell us so. If you find it troublesome to think to renew every year, give us an explicit order to continue till otherwise instructed, and we will undertake to renew your subscription from year to year, and send you bills as they become due, the arrangement to hold good as long as the bills are paid, and no longer. A great many dentists have already thus assured themselves of receiving the numbers without a break. There is still room for more names on this list. It saves you trouble. All you have to do after the first order is to pay the bills. We do the rest.

Those whose subscriptions expire with this issue will find a bill for the next volume inclosed. Kindly return this with your remittance, either with or without the detachable blank at the end of the reading matter.

Subscription price, to United States, Canada, and Mexico, $2.50 a year in advance ; to other Universal Postal Union countries, $3.00.

Subscriptions must begin January or July.

THE S. S. WHITE DENTAL MFG. CO.

OBITUARY.

DR. W. F. GIDDINGS.

DIED, at Seattle, Wash., October 13, 1894, W. F. GIDDINGS, D.D.S., in the forty-first year of his age.

Dr. Giddings was born in Portland, Me. He studied dentistry at the Boston Dental College, from which he graduated about 1874. He soon entered practice in New York city, where he continued for about four years, being a part of that time associated with Dr. Perry. He then went to Minneapolis, Minn., and during a practice there of about eight years he was instrumental in founding the dental department of the College Hospital of that city, in which he was an efficient professor for two years. In 1888 he removed to Seattle, Wash., where he soon enjoyed the distinction of being a leader in his profession.

Dr. Giddings was a member of the Washington State Dental Society, and was president of that body for the year 1892. He took a deep and abiding interest in all that pertained to the progress and elevation of his profession. He was married to Miss Auli Moore, of Minneapolis, who survives him with one son. He had many warm friends, to whom his decease is a personal loss.

The Washington State Dental Society passed the following resolutions upon the death of Dr. Giddings:

WHEREAS, The death of William F. Giddings calls upon us as a society to mourn the loss of one who was ever willing to extend his influence and superior ability toward the advancement and promotion of his profession, and whose admirable personal qualities endeared him to all with whom he was associated; therefore be it

Resolved, That in his death the society and profession loses one of its most able and conscientious workers; that the community loses a man of sterling worth and integrity, and that his family loses an exceptionally devoted husband and indulgent father;

Resolved, That we tender to the bereaved family our sympathy in this their deepest affliction.

[Signed by C. A. Holmes, P. A. Purdy, George W. Bragdon, committee.]

DR. E. A. GROSSMAN.

DIED, at Barnegat, N. J., July 30, 1894, ELLIS ALLEN GROSSMAN, M.D., D.D.S., in the twenty-sixth year of his age.

Dr. Grossman was born in New York city, and educated at the College of the City of New York, where he attained the degree of bachelor of arts. He then matriculated at the New York College of Dentistry, and graduated from that institution at the age of nineteen. Being then too young to enter dental practice for himself, he undertook the study of medicine, and at the age of twenty-one had graduated from three collegiate courses. He then entered dental practice in New York, which continued up to the time of his decease.

One who knew Dr. Grossman well writes of him: "The intellectual brilliancy, fine tact, and genial manner of Dr. Grossman made him at once a favorite with every one who knew him. . . . Little wonder that his friends grieve for him as one who cannot be replaced, and that his family are inconsolable." Dr. Grossman's career was not yet near its noontide, and it seems almost the irony of fate that one of so much promise should pass away so young. He lived a wholesome life, and his memory will be tenderly cherished.

PERISCOPE.

Report of a Case of Suppurative Disease in the Maxillary Antrum complicated with Abscess of the Lower Eyelid and attended with Septicemia.—E. S., aged seven, brought to me by her mother, March 10, 1894, on account of a very large swelling of the right lower eyelid, completely closing the eye and extending over cheek, which had existed for about ten days, growing rapidly larger, despite the application of a salve ordered by the medical attendant. There was a history of "matter running from the nose" for several months before, when it partially ceased, and a few days later the swelling of the face appeared and the other symptoms set in. The child had a number of chills before coming to me, and was evidently seriously ill.

Status Præsens: The child dull and stupid; skin yellow; slight pustular eruption on the face and body; temperature 101°, higher in the evening; in fact, all signs of beginning septicemia. Right cheek and lower eyelid greatly swollen; pus distinctly present in the latter; pre-auricular and cervical glands swollen; the periosteum of the upper jaw on that side greatly swollen; the gums bleeding, and abscess in the roof of the mouth with much deep-seated pain over antrum.

The nasal passages were full of a muco-purulent discharge, which, when cleared away by Seiler's solution, showed purulent rhinitis. The two molar teeth (milk) were decayed, although they had not given rise to any discomfort. The eyeball was normal in every respect. From these conditions suppurative disease of the maxillary antrum was diagnosed, and the patient given quinin and sent to the Wisconsin general hospital.

Operation: March 11, Dr. F. E. Walbridge assisting. Chloroform-anesthesia. The pus was evacuated from the lid abscess in the line of the intra-orbital fold so as to leave as small a scar as possible. An opening was made with the drill through the alveolar process of the upper jaw above the molar teeth, and enlarged with a spoon. The bone was soft and mushy, coming away easily. But a few drops of pus were evacuated from the antrum, as apparently it had mostly escaped from the opening in the cheek, from which about an ounce had been taken. (Communication of the two cavities was not, however, at any time clearly established.) Dr. Walbridge extracted the loose teeth, and I then washed out the abscess cavities with 1-5000 sublimate solution, injected peroxid of hydrogen and inserted catgut drain in the cheek, and iodoform gauze in the antral opening. Recovery from anesthetic uneventful; temperature normal the next day.

On the next day a free discharge of sanguineous pus came from the opening in the jaw, and as this was sufficiently large a rubber drainage tube was inserted. More pus had accumulated in the lower lid. A mouth-wash of boric acid, nasal spray of Seiler's solution, and cod-liver oil, and syrup of iodid of iron were ordered, under which, in connection with daily cleansing of the two abscess-cavities with 1-5000 sublimate solution and injection with peroxid, that of the lower lid healed in two weeks, while the discharge persisted from the antrum for nearly six weeks, gradually diminishing until at the end of that period the opening was allowed to close, and since that time neither have recurred. The purulent rhinitis has been cured by the cleansing, and the child is now in good health. The incision in the lower eyelid left a very small scar adherent to the malar bone, and there has been some distortion of the alveolar process, which will eventually show in irregularity of the permanent teeth.—*H. V. Wurdemann, M.D., in Annals of Ophthalmology and Otology.*

Pyoktanin in Ptyalism.—Dr. Heimann, of Halle, reports a case exhibiting an intense and fœtid salivation of unknown cause, which existed since two years and was accompanied by œdema of the gums and redness of all the mucous membranes of the mouth. This ptyalism had resisted astringent gargles and the internal use of potassium iodid (though the latter had produced a temporary improvement, it was followed by the return of salivation). It finally disappeared under the influence of bathing the whole buccal mucous membrane with a one-tenth per cent. solution of blue pyoktanin, twice daily for three weeks.—*Amer. Medico-Surg. Bull.*, from *Sem. Médicale*, 1893.

Deaths under Chloroform.—Under this heading a correspondent of the London *Lancet* says, "The cases of death under chloroform which have been recently recorded, and others which have recently occurred but have not been recorded, suggest the question, Why was chloroform given? They were all patients who could have taken ether quite readily, yet chloroform was preferred, with fatal result. Chloroform is the anesthetic liked by the patient, and it is easier for the surgeon to give, but the fact remains that it is very fatal and that no amount of auscultation of the chest or other investigation will give information which will enable any one to say whether the patient will take it safely or not. There are some cases for which chloroform is the only anesthetic that can be used, but for all ordinary cases ether should be given. The surgeon who deliberately gives chloroform instead of ether and loses his patient exposes himself, in my mind, to the charge of manslaughter, unless able to give very good reason for his choice of the anesthetic The one is safe, the other is not No one can gainsay this. A common-sense rule to make in all our hospitals would be one to compel the anesthetist to give ether only, unless with the express permission of the surgeon in charge of the patient. There would be fewer deaths."

An Antidote for Prussic Acid.—Dr. J. Antal (*La Semaine Médicale*, No. 48, 1894) has found the nitrate of cobalt to be a very efficacious antidote to prussic acid. In a watery solution of ½–1 per cent. it is capable of neutralizing not only the drug in the stomach, but also that in the blood; ingested, even in a large quantity, it is devoid of toxic action. This salt of cobalt has the advantage of being eliminated from the body as fast as it is absorbed from the digestive tract. From his experiments on animals, dogs, and rabbits, he would advise hypodermic injection of a ½ per cent. solution (20 to 30 c. c.) to antidote that portion of the poison which has already penetrated into the blood, while the same solution may be drunk by the glassful. If the patient be unconscious, introduce it through a stomach-tube.—*Cincinnati Lancet-Clinic.*

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HINTS, QUERIES, AND COMMENTS.

To the Editor of the Dental Cosmos:

Sir,—I desire to call attention to the use of formol in dental practice.

I owe to M. G. de Marion, a dentist of Paris, France, the suggestion of the possible usefulness of this substance as a dental antiseptic. Having seen M. Pottevin apply a solution of formol for the cure of favus at St. Louis Hospital, in Paris, M. Marion thought it might be useful in the treatment of infected teeth. He has treated a large number of infected root-canals simply by filling them with cotton saturated with a thirty-three per cent. solution of formol hermetically sealed in, and in no instance as yet has there been any subsequent inflammatory action. I have used the same solution quite recently in the sterilization of canals, and the results obtained are very satisfactory. If further experiments prove that formol is as powerful an antiseptic as it seems to be, and above all has the power of penetrating tissue that is claimed for it, there can be no doubt of its superiority over all other antiseptic agents for the treatment of infected root-canals.

It is a clear liquid of very pungent odor and taste. I would like to know what results others obtain from this substance.—A. E. Mascort, Philadelphia, Pa.

[The substance alluded to as formol by Dr. Mascort is formic aldehyde, and is essentially the same material dispensed under the name formalin, which is manufactured by Schering.

Formalin is said to be a forty per cent. solution of formic aldehyde.

We have made a limited number of tests of formalin in the class of cases noted by Dr. Mascort, with most satisfactory and promising results.—Ed. Dental Cosmos.]

To the Editor of the Dental Cosmos:

Sir,—In your "Hints, Queries, and Comments," October Cosmos, Dr. J. Herbert White, of Elizabeth, N. C., takes issue with me on my acknowledged inability to get cohesion (or welding) between cohesive and non-cohesive gold. To do so would be an impossibility in physics, and the doctor is either mistaken in thinking the White Co.'s soft foil to be non-cohesive, or—which is more likely—he is getting his apparent union by interdigitation, which is the cardinal principle in my method, except that I provide that it shall be mechanically thorough and safe, instead of haphazard. If the doctor will only test his idea thoroughly in teeth out of the mouth he will be easily convinced, or else he is using two sorts of cohesive gold and does not know it. Let him condense his foundation hard and leave no undercut to hold his last gold, and then see if the two do not part at that exact point. There can be no such thing as non-cohesive gold cohering.—J. W. Eggleston.

For persistent hemorrhage after tooth-extraction Dr. Wm. Huntly, in the *Indian Medical Record*, advises a full dose of tincture of opium and twenty grains of calcium chlorid. He has also used this treatment successfully in hematemesis.

A MONTHLY BIBLIOGRAPHY OF DENTAL LITERATURE.

COMPILED BY J. MELVIN LAMB, M.D., D.D.S., WASHINGTON, D. C.

The abbreviations of titles used are those common to bibliographical work, and will, it is presumed, be readily comprehended by any one familiar with dental or scientific publications. Any explanation will be gladly furnished by the compiler. A star (*) indicates a Thesis.

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LIST OF UNITED STATES PATENTS

PERTAINING OR APPLICABLE TO DENTISTRY

ISSUED DURING OCTOBER, 1894.

October 2.—No. 526,785, to THEO. G. LEWIS. Dental vulcanizer.
" " No. 527,032, to GEORGE F. WHITING. Brush support.
" " No. 527,037, to LEVI L. FUNK. Electric mouth battery.
" *9.*—No. 527,218, to ADRIAN S. RUTHERFORD. Metallic-covered wax for dental or other purposes.
" " No. 527,219, to ADRIAN S. RUTHERFORD. Wax product for dental or other purposes.
" *16.*—No. 527,690, to JEPTHA G. HOLLINGSWORTH. Dental tool.
" *23.*—No. 527,817, to JOSEPH SPYER. Rubber dental plate blank.
" *30.*—No. 528,163, to EDWARD B. HITCHCOCK. Dental mirror.

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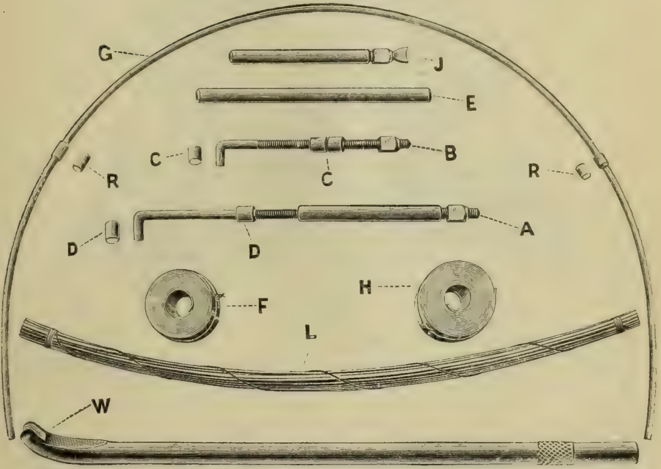

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Jack-Screw "E" and "J"		1.00
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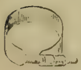
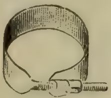


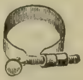
Bicuspid.

FIG. 2.



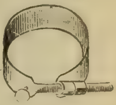
Molar.

FIG. 3.



Bicuspid.

FIG. 4.



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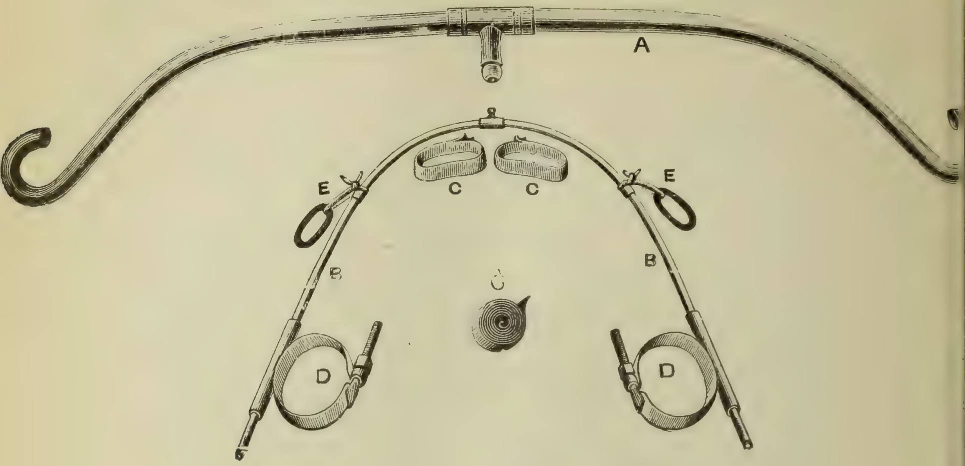

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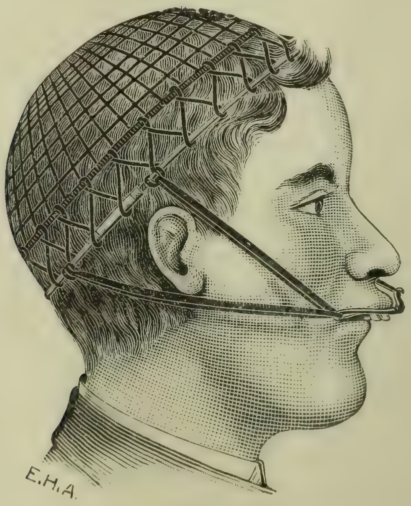

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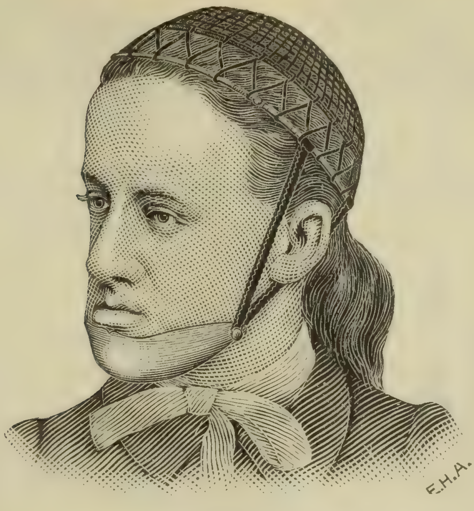

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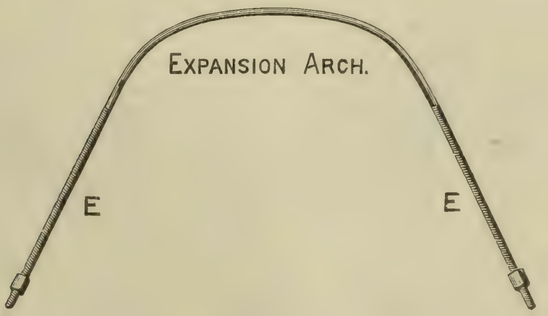

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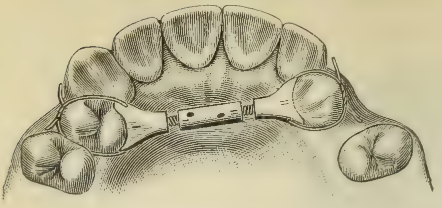
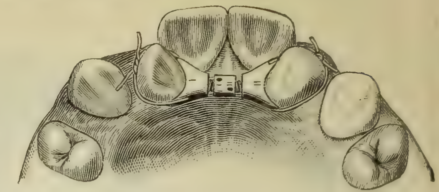
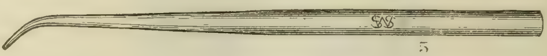
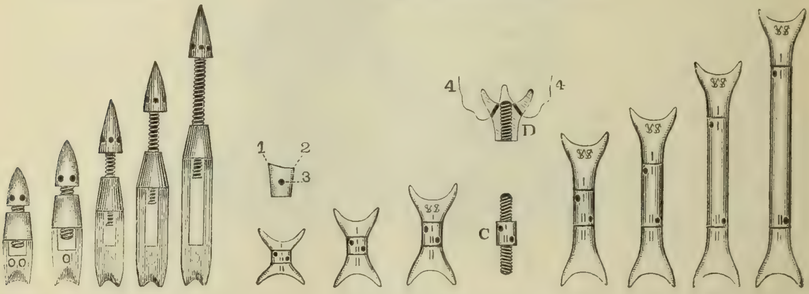






Old Style. Modified McCullom.



00	0	1	2	3	A	B	C		D	E	F	G
1/2	5/8	13/16	7/8	1 1/16	1/4	5/16	3/8	1/2	5/8	3/4	1	1 1/4
5/8	3/4	1 1/16	1 5/16	1 9/16	5/16	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2

Each Jack-Screw length *closed* is indicated above the line in fractions of an inch; the *open* length is found below the line.

Dr. E. S. Talbot having suggested the need for some very short Jack-Screws, we have revised the series, adopting the thinner and finer screw thread of the "Old Style," and modifying the "McCullom" heads to fit the cervical eminences of the teeth. The cuts depict the sizes and lengths when closed. The A, B, C Heads vary in shortness, but the D Head is long and is used on the E, F, and G Bars. The D Heads put on the C Bar make the ½ inch closed Jack-Screw. One side of each Head is longer (as at 1) than the other side (see 2), in order that the long or short side may go next the gum according as the tooth may incline forward or back. The ligature holes (see 3) pass through the sides so that the ligature (see 4 in the section view of a D Head) will draw the Head directly upon the tooth as shown in the two illustrations of the applied Jack-Screws.

Each right-hand Bar-Screw has a mark (1) to show that it will screw into a right-hand Head on which is a like mark (1). Each left-hand Bar-Screw and Head has *two* such marks (11), so that no mistake need be made in changing a long Head for a short Head (as D in place of C, for instance). Whatever the space between the teeth, it can be exactly fitted by reason of the interchangeableness of these Heads and Bars. Some extraordinary cases can be met by putting an "Old Style" (say No. 3) Bar in a right-hand McCullom Head, or a right-hand McCullom Bar in an "Old Style" Head.

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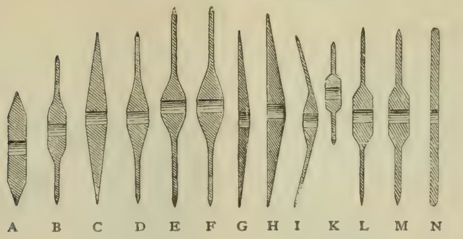

PRICES.

A to N, not Mounted	each 10 cents ; per doz.	$1.00
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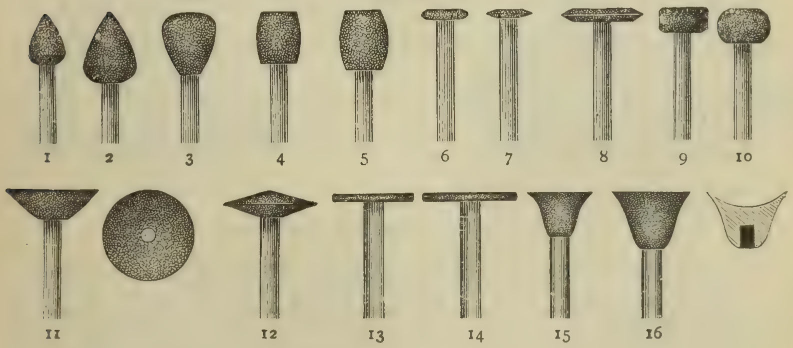

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The Gem Disks and Points are made of entirely new material, and having been tested by quite a number of dentists and shown at several conventions, are found to be of superior cutting quality. The wear is uniform, there being no soft spots such as are found in many of the disks and points of other manufacturers.

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Machine-Made—Mathematically Correct.

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A bur which will outwear four others ought to sell for four times as much. Others ask as much for burs with only one-fourth the working capacity as we get for the "Revelation." Which is cheaper?

A bur which will do no more than one-fourth as much work as another ought to be worth only one-fourth its price. We have yet to hear of any one offering "cheap burs" at 56¼ cents a dozen. "Revelation" Burs are only $2.25.

At the Midwinter Fair Dental Congress, at San Francisco, the machine test was applied in the presence of a large number of dentists, and with the usual results. While other burs entirely failed to penetrate the steel testing-plate, the "Revelation" Bur went through it in fifteen seconds, and this was repeated with the same bur several times, thus proving not only its efficient and rapid-cutting quality, but its durability under the severest tests.

PRICES.

Round	Nos. ½ to 7	doz. $2.25.	Nos. 8 to 11	doz. $3.00.
Wheel	" 11½ " 18		" 19 " 22	
Cone	" 22½ " 29		" 30 " 33	
Inverted Cone	" 33½ " 40		" 41 " 44	
Bud	" 44½ " 51		" 52 " 55	
Fissure, Square End	" 55½ " 62		" 63 " 66	
Fissure, Pointed	" 66½ " 73		" 74 " 77	
Oval	" 88½ " 95		" 96 " 99	

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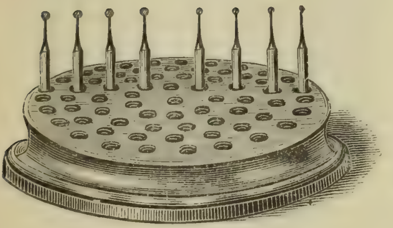
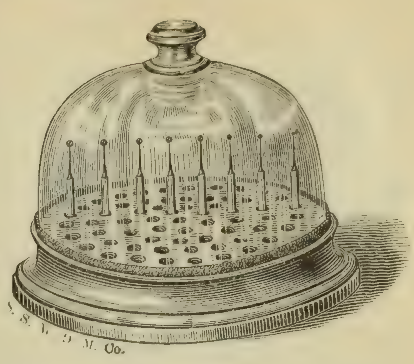
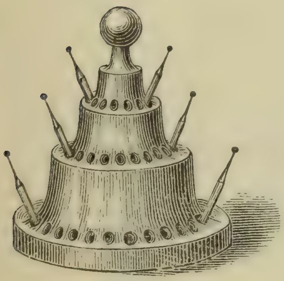


1





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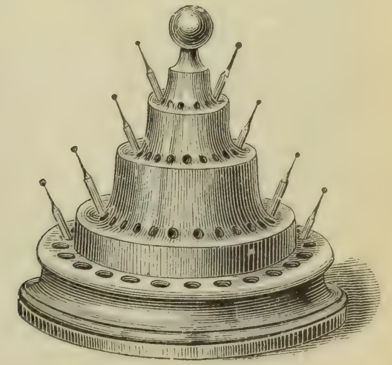

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Nos. 3, 4, and 5 patented March 2, 1875.

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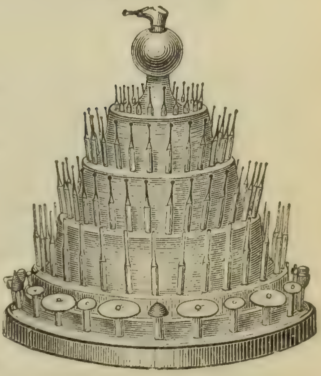

5

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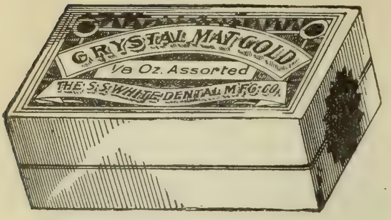

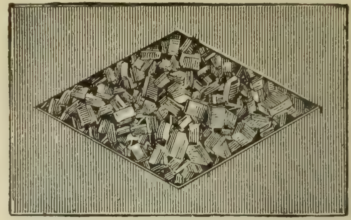

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It spreads under the instrument with a wax-like softness.
It has no tendency to ball, if properly worked.
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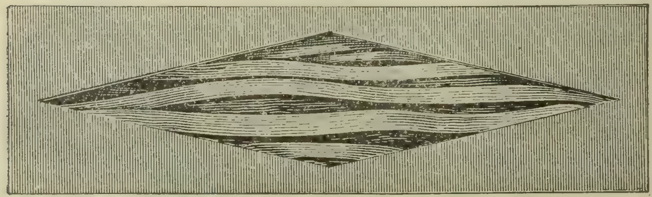

Put up in the form of pellets or blocks, in packages each containing ⅛ oz.; also in strips or ribbons, which some operators prefer. Sizes 1 to 7 are Mats, which are also put up assorted; sizes 8 to 10 are Strips. Kept protected from atmospheric changes when not in use, as all gold filling-material should be, Crystal Mat Gold will preserve its good qualities indefinitely. The boxes in which Crystal Mat Gold is sold will preserve it all right if kept closed. These boxes are neat in appearance, with handsome lithographed labels, and the bottoms are glazed with clear mica to show the contents.

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Per ⅛ oz.	$4.00
" ½ oz.	15.50
" oz.	31.00

Precious Metals Strictly Cash.

GLOBE GOLD FOIL.

"No Better Foil Made Anywhere."

A gentleman of long practice, speaking to one of our representatives, said, "I have used Globe Gold Foil from the time of its first introduction, and I like it to-day as well as ever. You may say what you please of other foils, but in my judgment there is no better made anywhere than the Globe."

SIX VARIETIES.

Non-Cohesive or Soft. Semi-Cohesive. Extra-Cohesive.

For sale in Nos. 3, 4, 5, 6, 8, 10, 20, 30.

Crystallized (Corrugated) Dead Soft. Crystallized (Corrugated) Semi-Cohesive.

Supplied in Nos. 3, 4, 5, and 6.

The Non-Cohesive or Soft Foil. An exceedingly soft Gold which when made up into masses or blocks, cylinders, or pellets, yields readily under the instrument without "balling."

The Extra-Cohesive Foil. This Foil, as put up, may be used cohesively when made into pellets or ribbons. When heated in the flame of an alcohol lamp it becomes *exceedingly cohesive*, and can then be used successfully only by those who fully understand how to take advantage of this property. Attention is called to the unusual softness exhibited by this grade of Gold under the burnisher after having been packed cohesively.

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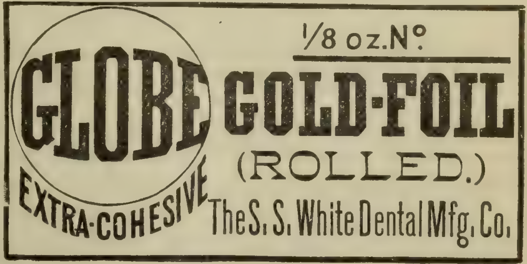

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EXTRA-COHESIVE

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Put up in small envelopes bearing the above label.

Nos. 20, 30, 40, 60, 120, and 240 kept in stock.

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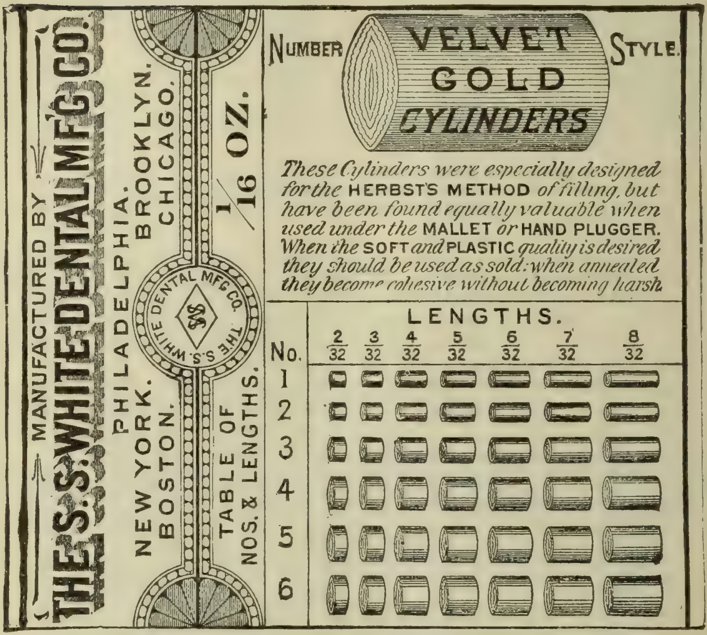
1/8 oz.		$4.00
1/2 oz.		15.00
1 oz.		30.00
2 ounces at one time	per oz.	29.00

VELVET GOLD CYLINDERS.

Trade-Mark "Velvet Gold."



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1/2 oz.	17.00
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"1000 FINE" GOLD FOIL.

The S. S. White Dental Mfg. Co.
1000 FINE
COHESIVE.
GOLD FOIL
NEW-YORK. PHILADELPHIA. CHICAGO.
BOSTON. ATLANTA. BROOKLYN.
SSW

"1000 *Fine*" *Soft Gold Foil.* Very soft, easily worked, readily adapted to cavity walls, yet tough and strong. Made cohesive by heating. Nos. 2, 3, 4, 5, 6, 10, 20, 30, 40, 60, and 120.

"1000 *Fine*" *Cohesive Foil.* Sufficiently cohesive for most cases; made more cohesive by heating. Nos. 2, 3, 4, 5, 6, 10, 20, 30, 40, 60, and 120.

"1000 *Fine*" *Unannealed Gold Foil.* Put up just as it comes from the beaters' skins. Nos. 3, 4, 5, and 6.

"1000 *Fine*" *Rolled Gold, Extra Cohesive.* For finishing surfaces, contours, etc. Prepared entirely by rolling. Nos. 20, 30, 40, 60, 120, and 240.

"1000 *Fine*" *Corrugated Soft Gold Foil.* }
"1000 *Fine*" " *Cohesive Gold Foil.* } Nos. 3, 4, 5, and 6.

These last are the regular "1000 Fine" Foils, with the addition of a beautifully corrugated surface.

Prices for all varieties of "1000 *Fine*" *Gold Foil.*

⅛ oz.	$4.00
½ oz.	15.00
1 oz.	30.00
2 ounces at one time . . . per oz.	29.00

For all numbers except No. 2, which is $2.00 per ounce extra.

PACK'S GOLD CYLINDERS.

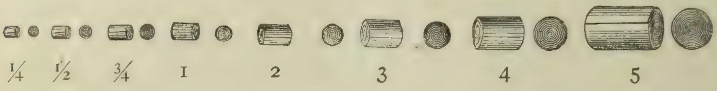
Patented July 4, 1876.

Universally known, highly approved, generally used, and always reliable. We call special attention to the uniformity of these Cylinders.

FOUR VARIETIES.

Semi-Cohesive Crystal Foil Cylinders. Soft Crystal Foil Cylinders. Semi-Cohesive Crystal Loose-Rolled Cylinders. Soft Crystal Loose-Rolled Cylinders.

We can also furnish them, on order, of plain foil, either Soft or Cohesive.



Put up in ⅛-oz. boxes (Nos. ¼, ½, ¾, 1, 2, 3, 4, 5, and assorted), in a manner calculated to preserve the gold unimpaired for any length of time.

Price	per ⅛ oz.	$4.00
"	" ½ "	15.00
"	" oz.	30.00
" 2 ounces at one time	" "	29.00

QUARTER CENTURY GOLD FOIL.

This is one of the oldest Gold Foils on the market, having been known to the profession more than forty years.

In the hands successively of Jones & White; Jones, White & McCurdy; Samuel S. White, and The S. S. White Dental Manufacturing Co., it has had a large and increasing sale. Its reputation is due mainly to the excellence of the Soft variety.

TWO VARIETIES.

Nos. 3, 4, 5, 6, 8, and 10.

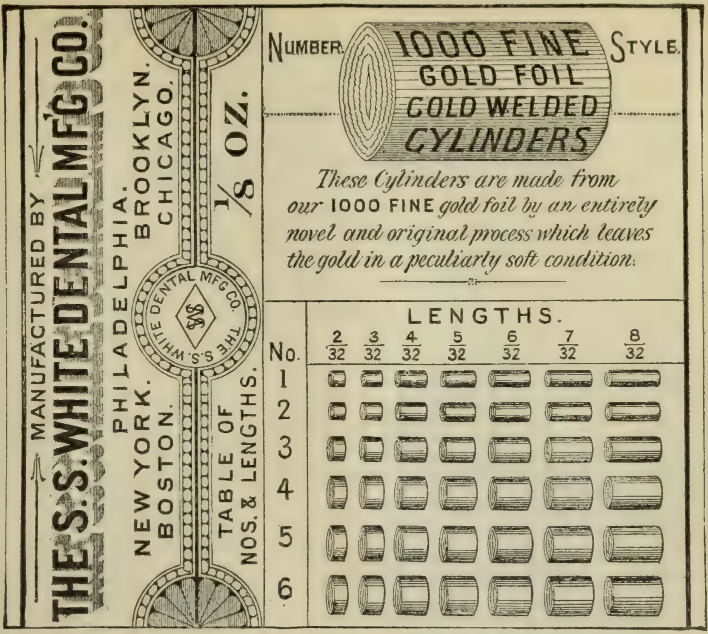
Soft.—Is tough and of a kid-like softness; can be made quite cohesive by heating.

Cohesive.—For use cohesively only.

PRICES.

⅛ oz.	$4.00
½ oz.	15.00
1 oz.	30.00
2 ounces at one time . . . per oz.	29.00

"1000 FINE" COLD-WELDED CYLINDERS.


MANUFACTURED BY
THE S. S. WHITE DENTAL MFG. CO.
PHILADELPHIA. BROOKLYN. CHICAGO.
NEW YORK. BOSTON.
THE S. S. WHITE DENTAL MFG. CO.
1/8 OZ.
TABLE OF NOS. & LENGTHS.
NUMBER
STYLE.
1000 FINE GOLD FOIL COLD WELDED CYLINDERS
These Cylinders are made from our 1000 FINE gold foil by an entirely novel and original process which leaves the gold in a peculiarly soft condition.
LENGTHS.
No.
2/32
3/32
4/32
5/32
6/32
7/32
8/32
1
2
3
4
5
6

"Cold-welded" is the characterization of the peculiar process by which the edges of these cylinders are fastened together to prevent their unrolling. By this process the entire mass of the cylinder is left homogeneous in texture. Made of the well-known "1000 Fine" Gold Foil.

"1000 *Fine*" *Cold-Welded Soft Gold Cylinders.* Soft and very adaptable, but sufficiently cohesive when heated.

Sizes 1, 2, 3, 4, 5, 6, and assorted.

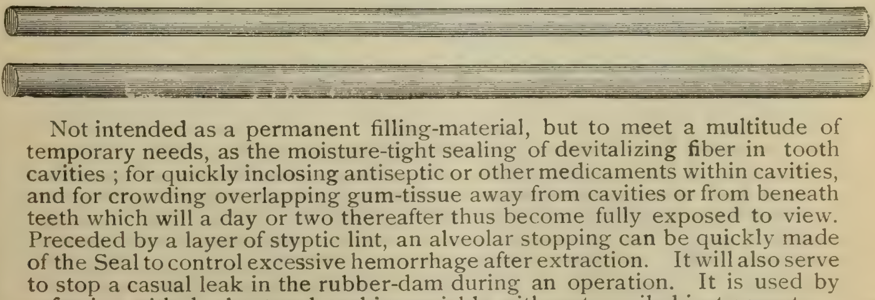
"1000 *Fine*" *Cold-Welded Cohesive Gold Cylinders.* Although cohesive, they are readily adaptable, and very rapid work can be done with them.

Supplied in Nos. 1, 2, 3, 4, 5, 6, and assorted.

PRICES.

⅛ oz.	$4.00
½ oz.	15.00
1 oz.	30.00
2 ounces at one time . . . per oz.	29.00

Dressing Seal for Temporary Fillings, Etc.



Not intended as a permanent filling-material, but to meet a multitude of temporary needs, as the moisture-tight sealing of devitalizing fiber in tooth cavities; for quickly inclosing antiseptic or other medicaments within cavities, and for crowding overlapping gum-tissue away from cavities or from beneath teeth which will a day or two thereafter thus become fully exposed to view. Preceded by a layer of styptic lint, an alveolar stopping can be quickly made of the Seal to control excessive hemorrhage after extraction. It will also serve to stop a casual leak in the rubber-dam during an operation. It is used by softening with dry heat and packing quickly with wet or oiled instruments.

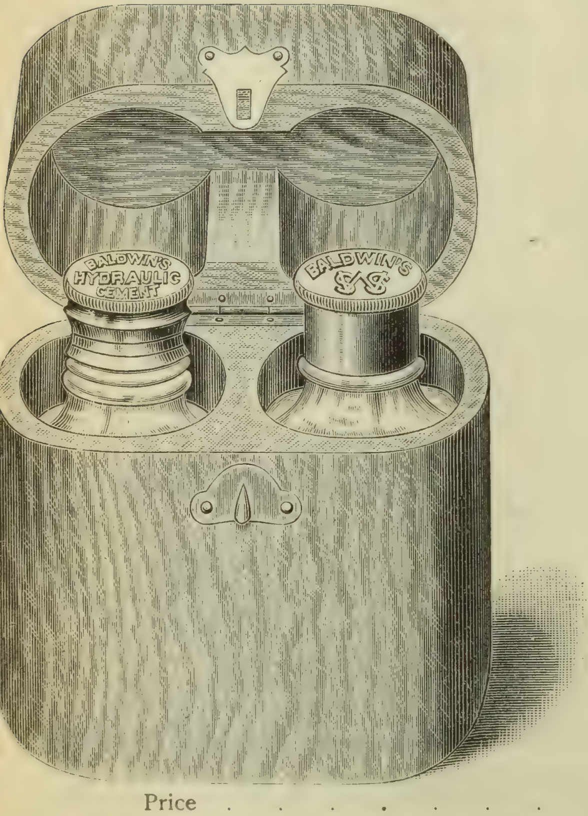
Made in convenient stick form, two sizes as shown, and put up in boxes of the two sizes, pink and white, assorted.

Price . . . . per box 50 cents.

BALDWIN'S HYDRAULIC CEMENT.

Devised by Dr. C. S. W. BALDWIN, of New York, and prepared exclusively by THE S. S. WHITE DENTAL MANUFACTURING CO.

✱ BALDWIN'S ✱
Hydraulic Cement.
THE S. S. WHITE DENTAL MFG. CO.
Philadelphia, New York, Boston,
Chicago, Brooklyn, Atlanta.



This Cement is of the zinc-phosphate class. Its relative durability is remarkable. In favorable mouths and situations it may be deemed reasonably permanent. In all cases, when mixed, packed, and finished in the manner and under the conditions prescribed, the fillings will prove satisfactory to every dentist of experience in the use of oxyphosphate cements.

Peculiarly suited to the requirements of crown- and bridge-work, for which it has received enthusiastic commendation. It is put up in small packages because of the necessarily increased cost of a superior article, and also because such cements work best during the two months following the opening of the package, although the Hydraulic Cement will work well until the last, if the bottles are kept closed, as their screw-caps afford ready means for the air-tight closure of both bottles.

Directions with each package.

Price . . . . per box $1.50

TESTIMONIAL.

PHILADELPHIA, April 3, 1890.

I have had so much satisfaction in the use of Baldwin's Hydraulic Cement that I wish others to know of it. I used it before it was put on the market, and for crown setting it is the most satisfactory I have ever tried. It is the only cement I am familiar with, the excess of which, instead of packing as the crown is pressed to place, will escape about the sides. Since beginning its use I have never found it necessary to cut a vent-hole for the escape of the surplus, as must be done when other cements are employed. It goes without saying that I use it exclusively for the purpose named. I find some peculiarities about the mixing which must be appreciated to assure the best success. It must be mixed quickly and thoroughly, else it seems to partially crystallize at the surface, in which condition of course it will not do for crown-setting; and it must not be made thinner than a thick cream paste, or it will not set satisfactorily. It can be worked for setting crowns thicker than other cements, because it will slip, not pack, in the placing of the crown. R. WALTER STARR.

ROCK ASBESTOS.

For Pulp-Canal Filling.

In the DENTAL COSMOS for January, 1893, Dr. E. C. Kirk suggested the use of long-fiber asbestos twisted into a thin-pointed wisp for filling pulp-canals.

It has certain marked advantages over any other fibrous material in common use for the purpose,—viz, it is inorganic and undecomposable by any of the substances ordinarily used for pulp-canal treatment; it is unaffected by the ferment agents there present; it is by reason of its non-combustible character readily and instantly sterilized by passing it through an alcohol flame and heating it to redness; it makes a suitable and unalterable vehicle for the application of tincture of iodin, potassium permanganate, nitrate of silver, sulfuric acid, or any of the agents which disintegrate cotton or wool fiber, as these are prone to do when used in concentrated solution. Further, it makes a most excellent vehicle in connection with oxychlorid of zinc, chloro-percha, or paraffin as a permanent and unalterable root-filling material.

We have obtained some specially fine specimens of Rock Asbestos, and supply it in packages of about one ounce each.

Price, per package . . . . 25 cents.

CAVITINE.

Since it has become the preferred practice to cover the walls of a dental cavity with a suitable film prior to the introduction of the filling, we present in Cavitine a superior, quickly-drying material, which is an effective insulator and preventive of pulp-irritation arising from thermal conduction by metallic fillings, or the hurtful action of zinc plastics. Cavitine is colorless, and aids in the preservation of the walls lined with it, being unaffected by moisture or chemical agents coming in contact with the tooth.

The properly prepared cavity should be perfectly dried with warm air, and carefully coated with Cavitine on a little wisp of cotton wound on a fine-pointed instrument. Follow with blasts of warm air, and fill at once.

Keep Cavitine closely stoppered, and avoid the vicinity of a flame while the bottle is open.

Price, Cavitine, per bottle . . . . . . 25 cents.

FOSSILINE.

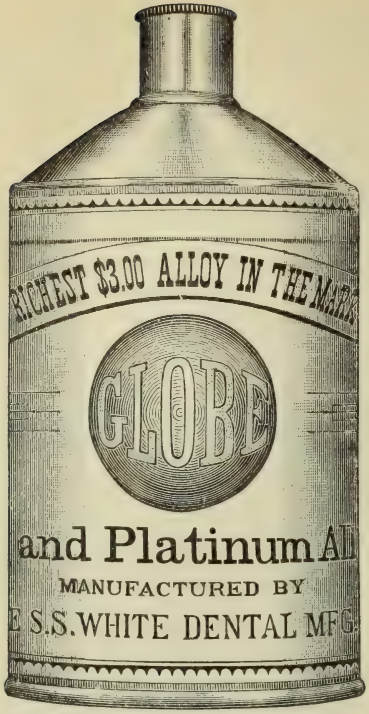
A MINERAL STOPPING WHICH WILL NOT CHANGE COLOR.

This Cement has met with an extensive sale in Great Britain, and has been favorably received by American dentists. The important features claimed for it are that it is a non-irritant; that it will harden under water or saliva, and stand the action of the fluids of the mouth better than any other filling of its class.

Price . . . . per package $2.00

THE S. S. WHITE DENTAL MANUFACTURING CO.,

Sole Agent for the United States.



Arrington's and Globe Alloy.

These two Alloys, each in its respective class, easily hold their position as leaders. Four-ounce lots are put up in tin flasks, as per illustration, as a convenience in handling. The flask is oval in shape, and has a screw top. For smaller quantities, envelopes are used.

PRICES.

Globe Alloy	per oz.	$3.00
"	2-oz. lot	5.50
"	4-oz. "	10.00
"	10-oz. "	23.00
Arrington's Amalgam	per oz.	2.50
" "	4-oz. lot	9.00
" "	10-oz. "	20.00

GLOBE ALLOY IN SHAVINGS.

A preference has been expressed by some practitioners for Globe Alloy in the form of shavings, as being from their point of view more readily amalgamated. We have it in stock, so that users can make choice of shavings or filings in ordering.

"SPLENDID" ALLOY.

"Splendid" Alloy amalgamates readily with a minimum quantity of mercury, in fact better than where the mercury is in excess, though it works well under all the usual modes of manipulation. The resulting amalgam is plastic, fairly quick-setting, and when hard is so strong-edged and metallic that it will spread under the pressure of the burnisher, and will not clog the file in finishing.

Put up in ½-oz. decorated tin boxes.

Price	per oz.	$3.00
" in 2-oz. lots	lot	5.50
" " 4-oz. "	"	10.00
" " 10-oz. "	"	23.00

"THE OLD RELIABLE."

LAWRENCE'S AMALGAM.

RES NON VERBA
LAWRENCE
TRADE MARK

This AMALGAM has received the endorsement of the Dental Profession at large for over forty-four years which would seem to render any remarks as to its excellence superfluous.

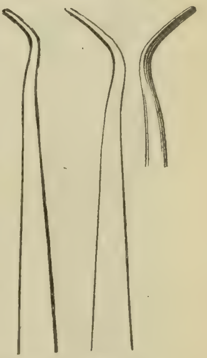
BEWARE OF FRAUDULENT IMITATIONS, whether from so called analysis or otherwise, and remember that Lawrence's Amalgam is always put up in a white lithographed envelope, covering a brown one containing the Amalgam, with Trade Mark on the lap of each, and both copyrighted.

THE S. S. WHITE DENTAL MANUFACTURING CO., Chestnut St., Cor. Twelfth St., Philadelphia, Pa., is sole Agent, and all communications should be addressed accordingly.

Prices, 1 oz. $3.00; 2 oz. $5.50; 4 oz. $10.00. For sale at all respectable Dental Depots.

Universal Approximal Instruments for Plastics.

Devised by Dr. EDWARD C. KIRK.



Small. Large.

The point or blade is of the simple flat burnisher type, with rounded, smooth edges, bent at an angle of about 45° to the shaft, and again canted to one side or twisted at the angle about a quarter of a turn, so that the one instrument reaches all the approximal surfaces, while the hand of the operator is kept out of the sight line, meeting the requirements of a universal instrument for these surfaces. It is particularly effective in condensing or compressing to place pellets of amalgam or gutta-percha, and especially for contouring the surfaces of these materials,—for the latter of which it is of course to be warmed. It will also be found useful in the adjustment of ligatures under the gingival margins of molars and bicuspids for retaining the rubber-dam, or as an ordinary burnisher for approximal gold fillings.

Two sizes, large and small, made either as Cone-Socket Point or Long-Handle Instrument, nickel-plated. These instruments are not Right and Left; each is universal.

PRICES.

Cone-Socket Point	35 cents.
Octagon Handle, Ball End	50 "

PHOSPHATE CEMENT.

Prepared by Dr. C. N. PEIRCE.

The properties of this material have been well tested and found admirable for the purposes suggested in the directions accompanying each package.

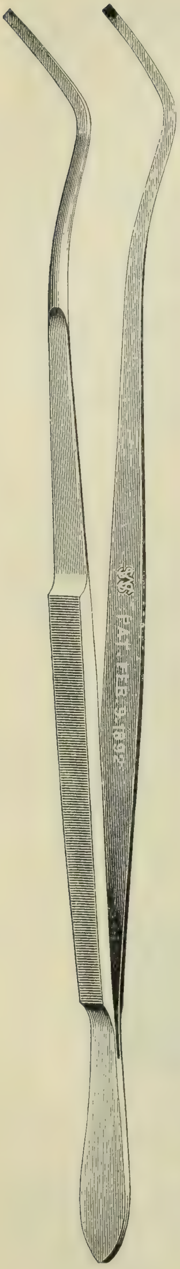
THE S. S. WHITE DENTAL MANUFACTURING CO. is now agent for the sale of this valuable Cement.

TRADE SUPPLIED AT A LIBERAL DISCOUNT.

Price . . . . per package $1.00

DR. HOW'S PELLET PLIERS.

Patented February 9, 1892.



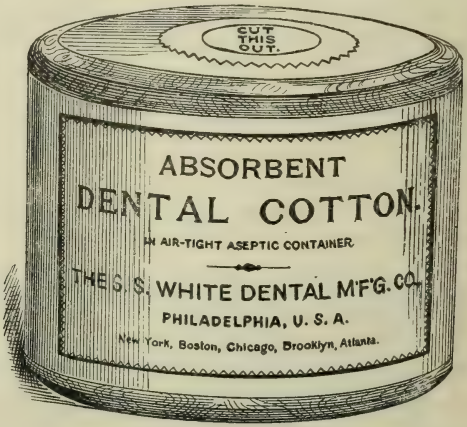
No. 21.

The novelty of this device, which, strictly speaking, belongs to the class of "tweezers," consists in forming a portion of one of the jaws into a thin plate-spring, so that an easily compressible object like a pellet of foil or mat gold may be picked up and carried to place with the least possible risk of squeezing it out of shape by undue pressure between the plier points, which in this instance are relatively broad and very thin. The advantages of such a delicately elastic grasp of objects which are liable to be crushed by the use of the ordinary pliers or foil-carriers are made obvious by a glance at the illustration.

The improvement is especially applicable in the manipulation of Crystal Mat Gold ; but any small, light objects, such as pieces of solder, amalgam, spunk, etc., may be more delicately handled by means of the Pellet Pliers than by any other instrument of that class hitherto in the hands of the profession. In practice these Plug Pliers prove to be an excellent amalgam carrier, the very soft, elastic pick-up function serving to hold and carry amalgam pellets or pieces of every degree of usable plasticity.

Price $1.25

Aseptic Dental Absorbent Cotton.


CUT THIS OUT.
ABSORBENT
DENTAL COTTON
IN AIR-TIGHT ASEPTIC CONTAINER
THE S. S. WHITE DENTAL M'F'G. CO.
PHILADELPHIA, U. S. A.
New York, Boston, Chicago, Brooklyn, Atlanta.

Aseptic Absorbent Cotton in an aseptic Container is the latest and best thing in absorbents. The Cotton is of extra long fiber, and specially carded to retain its fiber length. The weight of Cotton in the Container varies between two and three ounces. The Container is in itself a very convenient Holder. It is only necessary to cut out the piece in the center of the top, as shown in the cut, and it is ready for use.

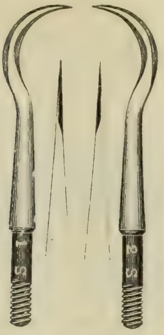
This is not only the best, but taking into account the quantity in the box, it is the cheapest Dental Absorbent Cotton sold.

The cut is one-half of the full size.

Price . . . . each $0.30

APPROXIMAL TRIMMERS.

Dr. Gordon White's Pattern.

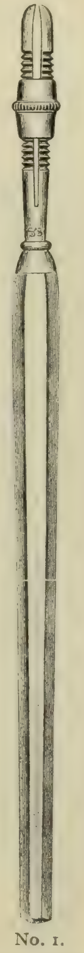


Of these instruments Dr. White says, "There is nothing that equals them for trimming the cervical margins of approximal fillings, and trimming the approximal sides of roots preparatory for crowns." Of the patterns submitted to Dr. White for approval, he says, "The samples are very satisfactory, and I am using them every day with great comfort."

PRICE.

For Cone-Socket Handles . . .	each 35 cents.

NERVE BROACH HOLDERS
Nos. 1 and 2.



No. 1.

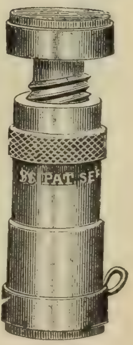
These are now made with a screw ring to hold the broach instead of a slide. This will hold the broach more securely.

PRICES.

No. 1, Ivory	$1.00
" 2, Steel	.75

DAINTREE'S ADJUSTABLE MOUTH-PROP.

Patented September 10, 1889.

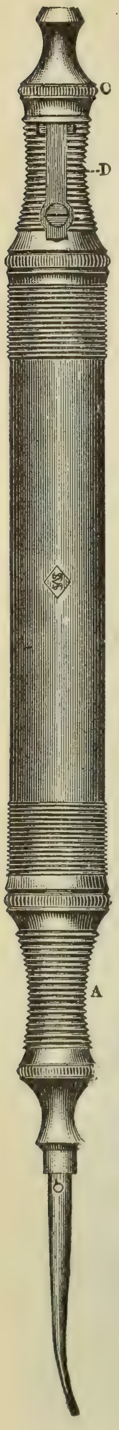


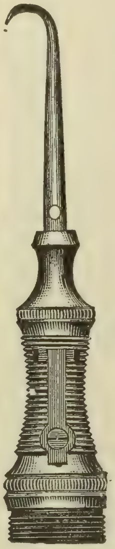
This Mouth-Prop combines facility of lengthwise adjustment to suit the "open" of the jaws with a spring which affords the necessary elasticity. With the spring compressed the length at the shortest adjustment is $1\frac{3}{16}$ inches; at the longest, $1\frac{1}{2}$ inches. One head screws into the body, around which the other swivels, an elastic spring being confined between the swiveling head and the body. The heads are cushioned with cork, and there is a ring for the attachment of a retaining cord.

Price, Nickel-plated	$0.75

THE ABBOTT AUTOMATIC MALLET.

Patented in Great Britain and United States,
August 16, 1887.





Two of the most valuable features of the Abbott Mallet are: 1. The blow is always uniformly dead. 2. The force necessary to produce the blow is very little. Consequently the strength and time of the operator are conserved by its use.

It was designed especially to avoid the defects of other appliances of its class. It is simple in construction and combines with the usual direct blow a back-action movement, actuated by the same mechanism, so that with it gold can be packed in cavities in almost any position in the mouth.

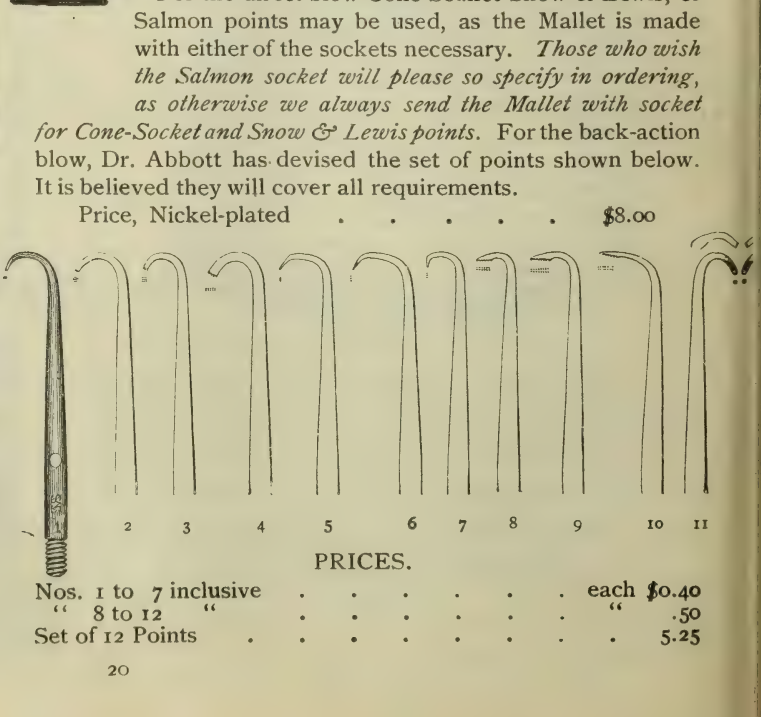
The working parts—pivotal latch, tripping mechanism, hammer, and spring—are entirely free from the case, being carried upon a spindle which passes centrally through it. This plan of construction avoids friction. Each end of the spindle is socketed for the reception of the plugger-points, one end giving the direct push or thrust-blow, the other the pull or back-blow.

The Mallet combines simplicity of construction with easy, effective operation.

All the parts liable to wear are made of hardened steel, and the instrument throughout is constructed in the best manner.

For the direct blow Cone-Socket Snow & Lewis, or Salmon points may be used, as the Mallet is made with either of the sockets necessary. *Those who wish the Salmon socket will please so specify in ordering, as otherwise we always send the Mallet with socket for Cone-Socket and Snow & Lewis points.* For the back-action blow, Dr. Abbott has devised the set of points shown below. It is believed they will cover all requirements.

Price, Nickel-plated $8.00



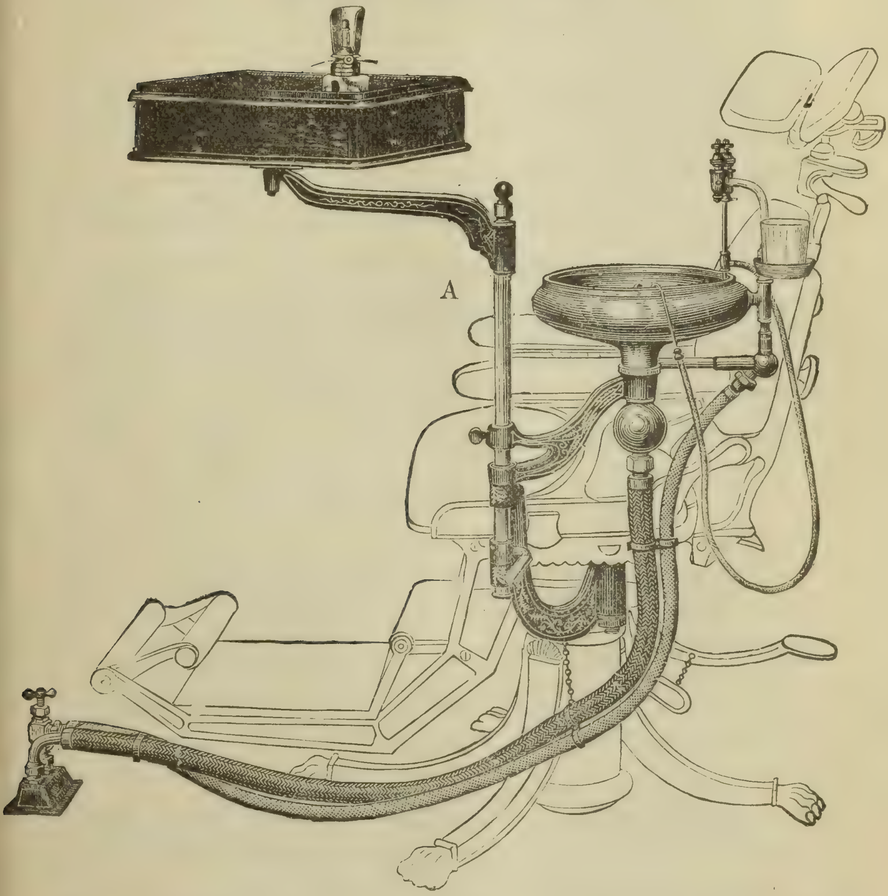
PRICES.

Nos. 1 to 7 inclusive	each	$0.40
" 8 to 12 "	"	.50
Set of 12 Points		5.25

ATTACHED FOUNTAIN SPITTOON.

With Bracket Table.

Patented Nov. 20, 1877, and May 24, 1881.



This combination meets the wants of those who prefer a Bracket Table attached to the chair. The rod A is elongated to bring the table to the proper height.

The table bracket swings on this rod, which can be raised or lowered to suit the convenience of the operator. The arrangement will be found especially useful in offices where the bracket cannot be conveniently attached to the wall.

PRICE.

Combination as illustrated, with plain Allan Table . . .	$85.50
" with Imitation Rosewood Table	79.50
" " Glass-Side Allan Table	88.50
" " Holmes Table	105.50

BOXING FREE.

PYORRHEA ALVEOLARIS.

WHAT IS PYORRHEA ALVEOLARIS?

A more or less general formation of pus about the roots of the teeth exuding from beneath the free edges of the gums.

WHAT IS ITS CAUSE?

Systemic predisposition, combined with decided induration of tooth-tissue or other local irritant (sanguinary calculus, caries or necrosis of process edge, gum pouches).

WHAT IS ITS TREATMENT?

If possible, through removal of all local possibilities for irritation, together with astringent, detergent and stimulant medication (zinc chloride, zinc iodide, carbolic acid and caustic potassa, dilute sulphuric acid, peroxide of hydrogen).

WHAT IS THE PROGNOSIS?

Possible amelioration of greater or less duration; *probable* recurrence of trouble, with usually gradual but persistent re-establishment of previous condition.

Flagg & Inglis "Dental Pathology and Therapeutics."

The use of Seabury's saturated solution of WHITE OAK BARK will absolutely prevent a recurrence or re-establishment of pyorrhea alveolaris.

It is a standard preparation, and may be used as a GARGLE full strength, without any ill effects.

12-oz. bottle, price.	$1.00;	per dozen	$8.00
6-oz. " "	.50;	" "	4.00
2-gallon jug, price per jug			8.00

TRADE SUPPLIED BY

THE S. S. WHITE DENTAL MFG. CO.

ORTHODONTIA.

Second Edition. Revised and Enlarged.

By S. H. GUILFORD, A.M., D.D.S., Ph.D.,

Professor of Operative and Prosthetic Dentistry in the Philadelphia Dental College; author of "Nitrous Oxide," etc.

This volume is one of the series of text-books authorized by the National Association of Dental Faculties. Dr. Guilford was selected to prepare it on account of his well-known fitness for the task. After its completion, some three years ago, it was accepted and indorsed, and recommended by the association.

The second edition, just published, has been largely rewritten, and enlarged by the addition of 42 pages, 52 new cuts, and two full-sized pages of plate illustrations. Like the first edition, it is printed on fine-toned heavy paper, and neatly bound in cloth.

Sent by mail on receipt of price.

Price by mail	$2.25

The S. S. White Dental Mfg. Co., Sole Agent.

Changes in Prices.

The relation existing between the manufacturers and consumers of dental as well as other goods is apt to be considered one of quasi-warfare. The one is supposed to be wholly bent on discovering ways to increase the price of his products, and the other no less diligent in improving every opportunity to get his wants supplied at something below the market rates. This idea, so far as it relates to the manufacturer, is a mistake.

The pressure of competition, and the desire to increase the volume of sales, stimulate him to seize every opportunity to reduce the cost of manufacture and thus enable him to sell at prices as low as his competitors.

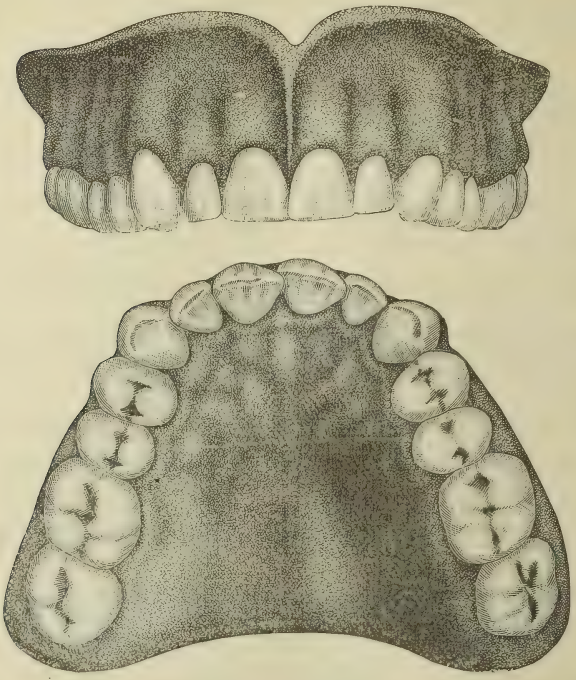
This downward tendency of prices in dental goods is well illustrated by the reductions in price of our manufactures during the year. These reductions, which have been noted in the COSMOS as they occurred, cover SEVENTY DIFFERENT ARTICLES, and the rate of reduction on the most important lines ranges from *17 to 40 per cent.*

There Has Been no Advance in the Price of Any Article.

The reductions of prices have been made possible partly by reduced cost of raw material, improvement in tools and methods of manufacture, and also by increased volume of sales, but in no case have they been effected by lowering the rate of wages or the standard quality of the goods.

An experience of half a century has proved that the high standard of quality of our manufactures is appreciated by the dental profession, and in every article made by us that standard will be maintained.

THE S. S. WHITE DENTAL MFG. CO.'S
PORCELAIN TEETH.



THE STRONGEST TEETH MADE.

EXCEL ALL OTHERS IN FORM, COLOR, TEXTURE, RANGE OF ADAPTABILITY, AND FAITHFULNESS TO NATURE.

A Choice of Over 2000 Forms.

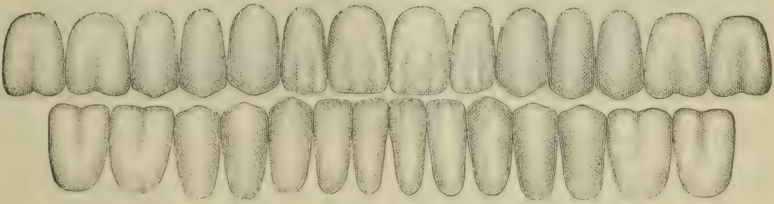
Awarded Medal and Diploma at the Chicago World's Fair.

At every great Exposition since that of London, 1851, our Manufactures have received the highest award.

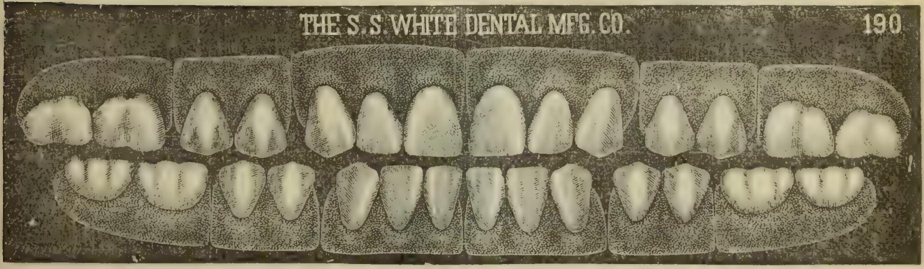
SOME OF THE KIND OF TEETH WE MAKE.

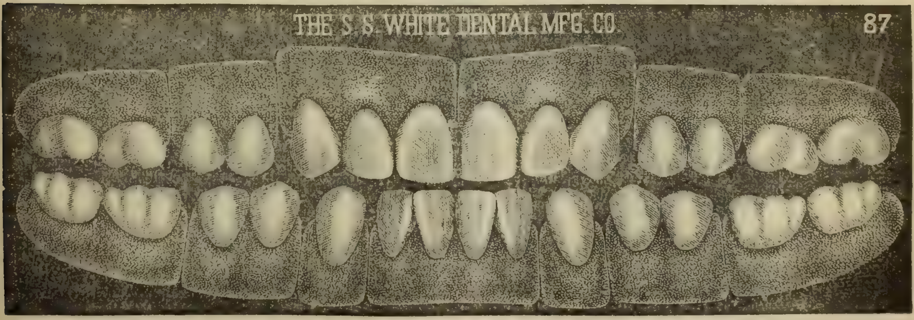
PLAIN TEETH FOR RUBBER WORK.

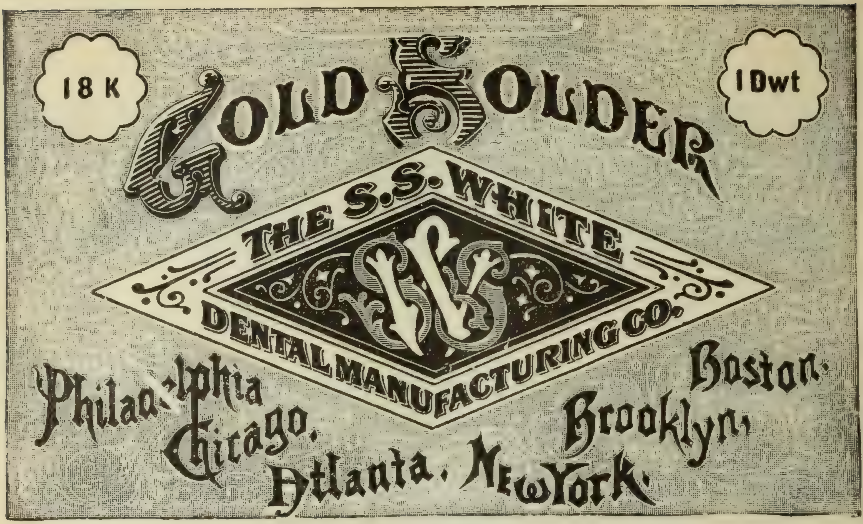
PLAIN TEETH FOR PLATE- AND BRIDGE-WORK.



GUM SECTIONS.


THE S. S. WHITE DENTAL MFG. CO.
190


THE S. S. WHITE DENTAL MFG. CO.
87



ALUMINUM PLATE		per Troy oz.	$0.20
" **INGOTS**		each	.20
GOLD PLATE, 18-k.		per dwt.	.95
" " 20-k.		"	1.05
" " 22-k.		"	1.15
" " 24-k. (.998 fine)		"	1.20
" " Coin		"	1.15
" " alloyed with Platinum (Clasp)		"	1.05
GOLD SOLDER, 14-k.		"	.80
" " 16-k.		"	.90
" " 18-k.		"	.95
" " 20-k.		"	1.05
" " 22-k.		"	1.15
FLUXED GOLD SOLDER FILINGS		per dwt. 18-k.	1.00
		20-k.	1.10
CROWN METAL (one side pure soft Platinum, the other pure Gold, equal parts, decidedly the best combination for metal crowns ever made)		per dwt.	1.20

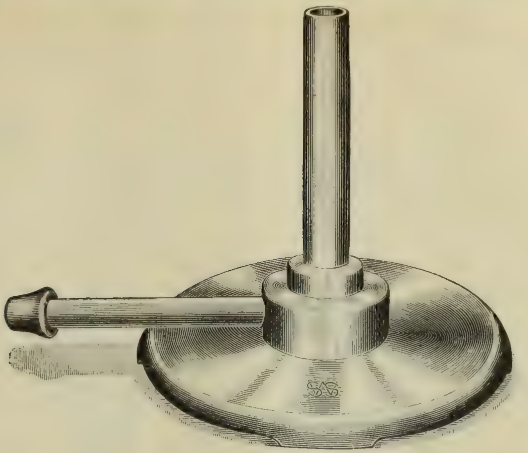
We can also supply a Crown Metal of Gold and Iridio-Platinum, making a harder and stiffer metal, at same price.

GOLD SCREW WIRE (see Tooth-Crown Appliances, etc., page 67, Condensed Price List, 1894).

GOLD WIRE, 18-k., round and half-round		per dwt.	1.05
" " 20-k.		"	1.15
" **SPIRAL SPRINGS,** 10-k.		"	.80
" " " 18-k.		"	1.15
" **SPRING ATTACHMENTS,** 4 in a set, per set, $6.00		each	1.50
" **WIRE,** alloyed with Platinum (Clasp)		per dwt.	1.15
PLATINUM PLATE, Hard or Soft, cut square			Prices fluctuate.
" " " " cut to pattern			
" **WIRE** " "			
SILVER PLATE, COIN	per oz. $1.25;	per dwt.	.08
" " **PURE**	" 1.35;	"	.10
" **CLASP**	" 3.00;	"	.18
" **WIRE, COIN**	" 1.60;	"	.10
" " **PURE**	" 1.75;	"	.12
" **SOLDER**	" 1.20;	"	.08
" **PRECIPITATED**	" 1.50;	"	.08
GRANULATED	" 1.50;	"	.08
SPRINGS		each	.25

PRECIOUS METALS STRICTLY CASH.

OFFICE BURNER No. 20.

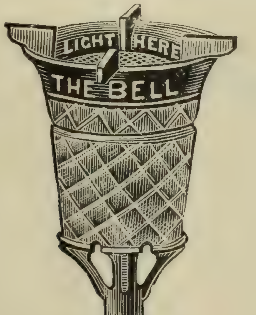


How to mix gas and air in a small burner, in proper proportion to effec smokeless combustion, whether the flame be three inches or a quarter of an inch high, has been a difficult problem to solve; but it has been done, and this neat, low, broad-based Burner is just what every dentist needs for office use.

It will not pop when the flame is low, neither will it smoke when the flame is quite high, and of greater volume (for soldering cap crowns, etc.) than any other Bunsen burner.

Price . . . . each 75 cents.

THE BELL GAS BRACKET STOVE.



Boils a quart of water in three minutes, and is exceedingly handy and useful for many purposes.

DIRECTIONS.

Place the stove on the gas-jet before lighting. Hold the burning match above the stove, turn on the gas and it will burn wholly above the gauze, where it should.

Price . . . . 15 cents.

SOLDERING APPLIANCES.

Devised by GEO. W. MELOTTE, M.D.S., Ithaca, N. Y.

FIG. 2.

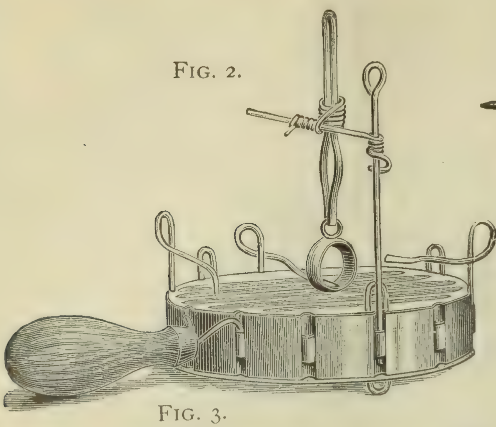


FIG. 8.

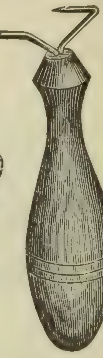


FIG. 1.

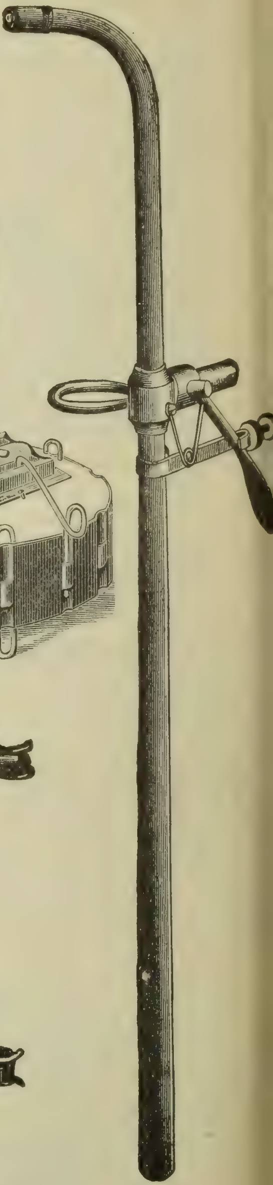


FIG. 3.

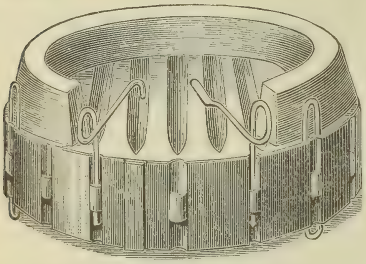


FIG. 4.

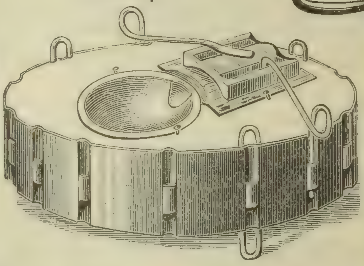


FIG. 5.

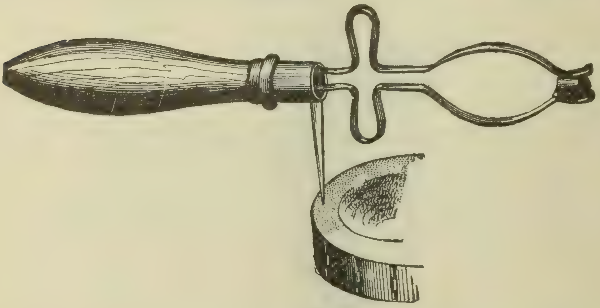


FIG. 6.

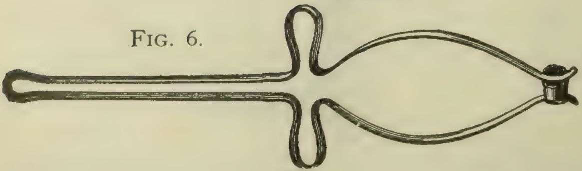
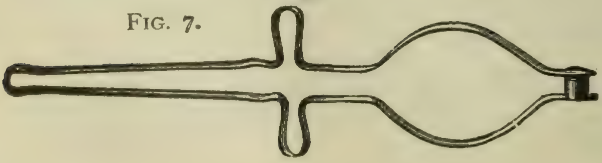


FIG. 7.



Dr. Melotte's Improved Soldering Appliances.

The usefulness and completeness of the set will be at once apparent. Directions accompany the apparatus.

BLOW-PIPE PAD.

Patented March 26, 1889.

The Blow-pipe Pad is about 4½ inches in diameter. It is made of wound asbestos tape surrounded by a metal band supplied with loops at regular distances apart for the reception of the handle hooks or spring clamps The construction of the Pad which is reversible, makes it a perfect cushion, into which pins can be readily thrust to hold small articles while being soldered. One face is grooved for soldering, the other has a depression for the melting cup. Adjustable feet permit the Pad to be set up away from the table when desirable. Fig. 2 shows the Pad with clamps and ring-holding device in position; Fig. 3 the grooved face with the removable rim (also of asbestos) for confining the heat, and Fig. 4 the reverse face with cup and ingot-mold attached. The ingot-mold has three matrices of different shapes and sizes. Fig. 8 shows the handle separately.

PRICES.

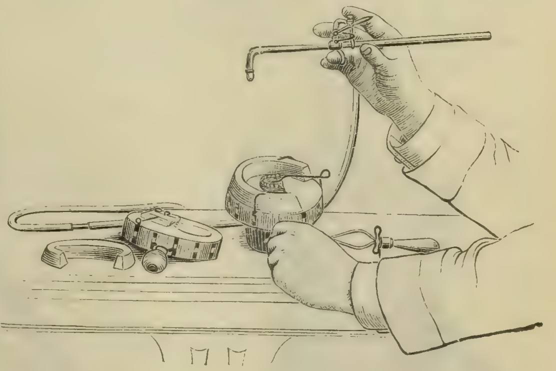
Blow-pipe Pad, complete, including Removable Rim, Ingot-Mold, Melting Cup, Handle, Ring-Holder, three Spring Clamps, and Feet	$2.00
The same, less Ingot-Mold and Melting Cup	1.50
Extra Melting Cups, each 10 cents; per doz.	1.00
Ingot-Mold separately	.50

IMPROVED GAS BLOW-PIPE.

Patented Dec. 18, 1888.

The gas supply is received through the valved tube (Fig. 1), by connecting it with rubber tubing to the gas-bracket. The spring valve which regulates the supply of gas may be set by means of the thumb-screw and jam-nut, to any flame desired. When used as a hand blow-pipe the best way to hold it is with the third finger through the ring as shown in Fig. 9. It can also be used with the foot bellows when a more powerful blast is required, or with nitrous oxide to produce an oxyhydrogen flame.

FIG. 9.



Price $3.50

SOLDERING CLAMPS.

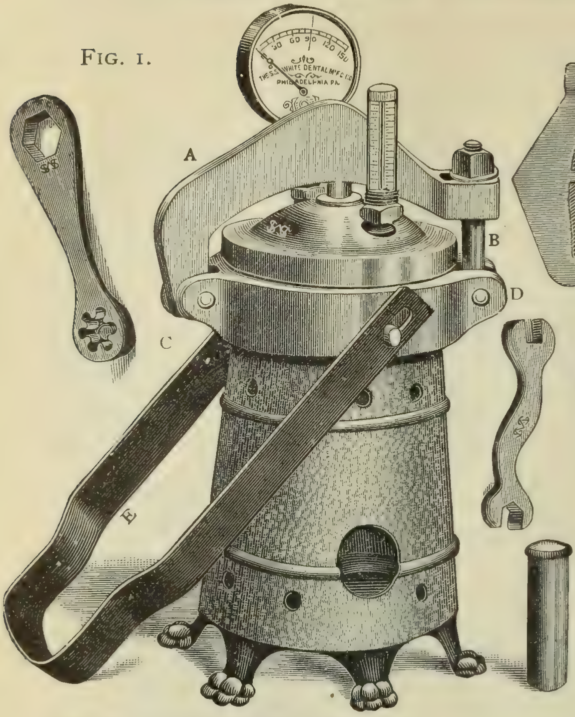
Patented September 20, 1887.

The Soldering Clamps, for holding gold collar crowns and caps while being soldered, have loops in the arms. The loops facilitate placing the Clamps in and removing them from the handle, and afford a ready means of rotating or changing the position of the work under the blow-pipe flame. The slight pressure required to hold the work is secured by pushing the shanks into the handle, the spur of which may then be fixed in the pad or in a piece of charcoal, etc. The left hand is then free to manipulate the solder while the blow-pipe is directed by the right hand as usual. The handle will grip either clamp-shank. The three shapes, also the spurred handle, are shown in Figs. 5, 6, and 7.

Price, per set of three Clamps and one Handle . . . $1.00

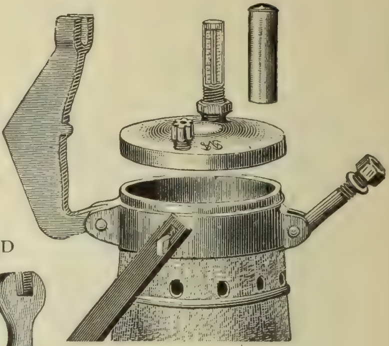
THE MANN VULCANIZER.

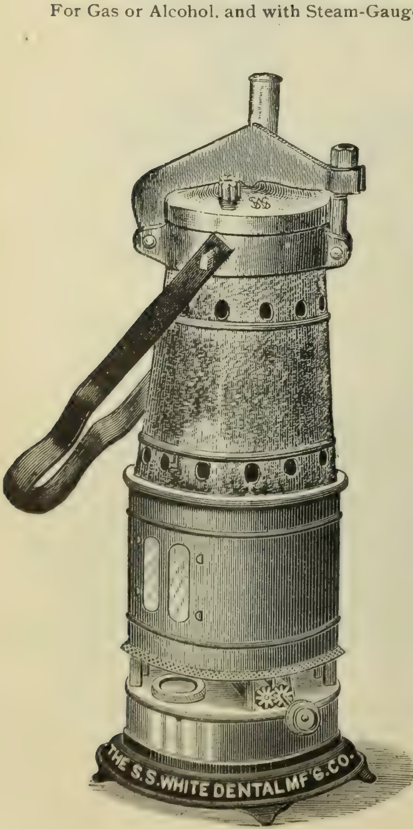
FIG. 1.



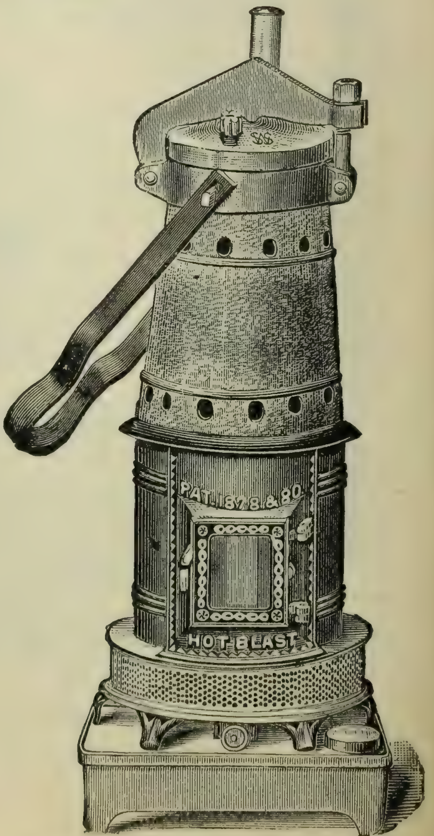
For Gas or Alcohol. and with Steam-Gauge.

FIG. 2.




THE S.S.WHITE DENTAL MF'G.CO.

With 4-in. Burner Kerosene Stove.



With No. 1 Hot-Blast Stove for Kerosene.

THE MANN VULCANIZER.

Patented May 25, 1886.

For the Mann Vulcanizer we claim superior strength The boiler is made of extra-heavy seamless copper. The quality of the material, its thickness, and the method of manufacture insure a strength far beyond what any ordinary use of the machine would require ; but to make assurance doubly sure, each boiler is tested before being put on sale by both hydrostatic and steam pressure, so that we have absolute knowledge that the strength is far in excess of requirements. The inside diameter is 4¼ inches, providing ample space for the largest flask.

In the facility with which the Mann Vulcanizer is operated is another decided advantage. The lid, instead of being screwed on to the boiler, is fitted neatly, and rests on a shoulder formed on the casting, and is secured by a heavy steel clamping-bar and screw-bolt, B. One end of the bar is hinged to the side of the boiler at C, the other end being slotted to receive the screw-bolt, which is hinged to the other side of the boiler at D. Rubber packing between the lid and the shoulder on which it rests makes the joint steam-tight. The lid is removed by unscrewing the nut of the screw-bolt a turn or two, when the bolt drops out of the slot and the bar is turned back, leaving the lid free to be removed. This method, while it gives as perfect a fastening as the usual plan, affords very much greater facility for opening and closing the boiler. Should the lid stick, by reason of the packing becoming chilled (a common occurrence with all vulcanizers), it is easily pried off with very much less trouble than is required when the top screws on.

Another decided advantage, to which special attention is asked, is the bail, E, a simple but heretofore unthought of device, which greatly facilitates the handling of the Vulcanizer, especially when hot, and the boiler can be opened for the removal of one case and the placing of another. To do this, the nut of the clamping-bolt is loosened a little at a time, allowing the steam to escape gradually until the bolt is released, when the bar can be thrown back and the top of the boiler raised. The bail is also useful in removing the boiler from the jacket, in tightening or loosening the screw bolt when closing or opening the boiler, and at all times when the boiler is to be lifted. When not in use it is readily removed.

The thermometers used are carefully and reliably made for this special purpose.

The metallic thermometer-frame is screwed upon an iron cup-shaped seat in the top at F, containing mercury, forming a "mercury bath."

We use for the Kerosene outfit of the Mann Vulcanizer the "4-inch Burner Kerosene Stove," which has a larger wick and will thus give more heat than the heater formerly sold for the purpose.

Fig. 1 is shown with steam-gauge attached.

Fig. 2 shows the bolt loosened, the bar thrown back, and the Vulcanizer open.

PRICE-LIST OF THE MANN VULCANIZERS.

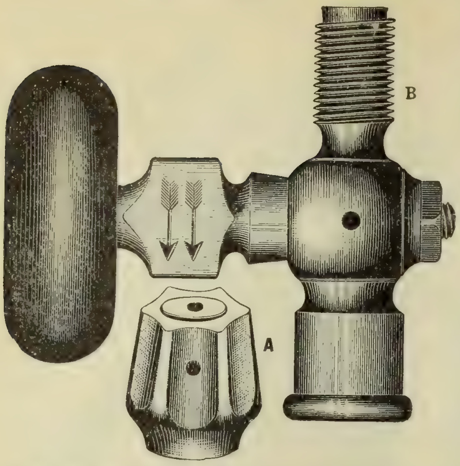
WITHOUT STEAM-GAUGE.

Two-Case Vulcanizer, for Alcohol (with No. 9 Lamp)	$18.00
" " " " Gas (No. 12 Gas Burner)	18.00
" " " " Kerosene, with 4-inch Burner Kerosene Stove	18.50
" " " " " " No. 1 Hot-Blast Stove . .	20.75
Three " " " Alcohol	20.00
" " " " Gas	20.00
" " " " Kerosene, with 4-inch Burner Kerosene Stove	20.50
" " " " " " No. 1 Hot-Blast Stove . .	22.75

Steam-Gauge adds $7 00 to these prices.

Gartrell Steam-Gauge and Gas-Regulator adds $13.50 to these prices.

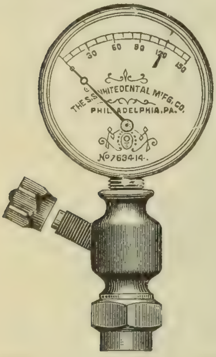
Blow-Off Valve for Vulcanizers.



This Valved Safety Plug (shown actual size) is provided with a two-way cock in addition to the usual safety disk and blow-off cap. The key of the valve is stamped on one side with a single arrow; on the other with two. When the key is in the position shown in the cut (with the double arrows *pointing upward or downward*) the steam passes directly through to the safety disk on the outer end of the plug. Should the disk blow out, the steam in the Vulcanizer can be prevented from escaping by turning the key horizontally across the stem of the plug with the double arrows *facing upward* while another disk is adjusted, thus saving the time required to heat up the case again. After the vulcanizing is completed, the steam can be blown off at the orifice on the side by turning the key so that the single arrow *faces* up. The cap A, containing the safety disk, is shown removed from the top of the safety plug B.

This Valved Safety Plug will be found decidedly superior to the ordinary plug. It can be applied to any of the Vulcanizers, and it can be used with or without the steam-gauge.

Price, Blow-Off Valve $1.00



Steam-Gauge for Vulcanizers.

This is a reliable Steam-Gauge, to which is connected a condensing-chamber, with pipes so arranged as to form a trap. Above this trap is placed a safety-disk attachment.

This Gauge can be placed on any of the modern vulcanizers having a blow-off or safety attachment, by simply removing the cap of same shown at A in the cut of the blow-off, and screwing on the gauge.

Price, complete $7.50

Endless Packings for Vulcanizers.

The principal advantage of the Endless Packings for Vulcanizers is that special sizes are made for the various vulcanizers for which they are intended, so that their use saves the time and trouble of fitting.

PRICES.

Endless Packings for Mann Vulcanizers . . .	each 12 cents.
" " " Whitney " . . .	" 8 "
" " " Hayes " . . .	" 10 "

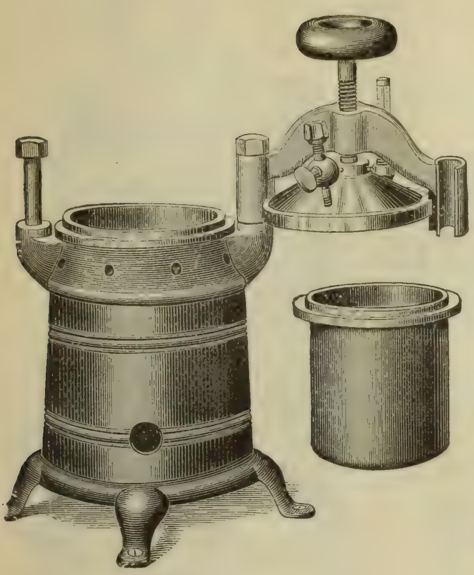
We have also the Strip Packings at the following

PRICES.

Strip Packings for Mann Vulcanizers	each 10 cents.
" " " Whitney "	" 5 "
" " " Hayes "	" 8 "

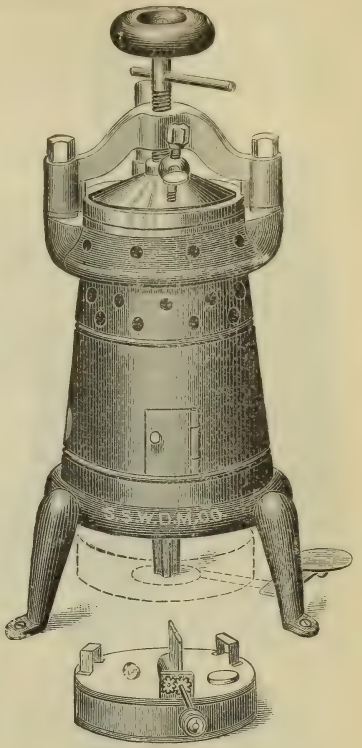
The C. A. Davis Vulcanizer.

Patent Reissue August 29, 1890.



For Gas or Alcohol.

No. 9 Lamp supplied for Alcohol; No. 12 for Gas-Burner.



For Kerosene.

The advantages of the C. A. Davis Vulcanizer are simplicity and strength. One hand only is required in tightening or loosening the lid, which is entirely independent of the hot-chamber.

The boiler or hot-chamber is made of heavy seamless copper, and around the top a brass ring is brazed, forming a shoulder which rests upon a steel collar bolted within the jacket to the base. The edge of the boiler fits neatly in a circular groove in the lid, the tightness of the joint being secured by means of rubber packing. The boiler is readily lifted out for emptying.

The lid is controlled by a center screw and two side guides on the arms of the yoke or cross-bar. The cross-bar is pivoted by its upright arm at one end to the steel collar which supports the boiler, the other arm being slotted to straddle a stop at the opposite side of the collar. This pivoted cross-bar, by means of a screw-bolt passing through its center, carries the lid of the boiler, the bolt being operated by a wood hand-wheel. If necessary to screw tighter than the wheel permits, a pin wrench is provided which can be passed through a hole in the screw-bolt. The thermometer and safety-plug are secured to the lid.

The center-screw with side guides make the movement of the lid exact, and the advantages of the swinging cover will be at once apparent to those experienced in the use of vulcanizers.

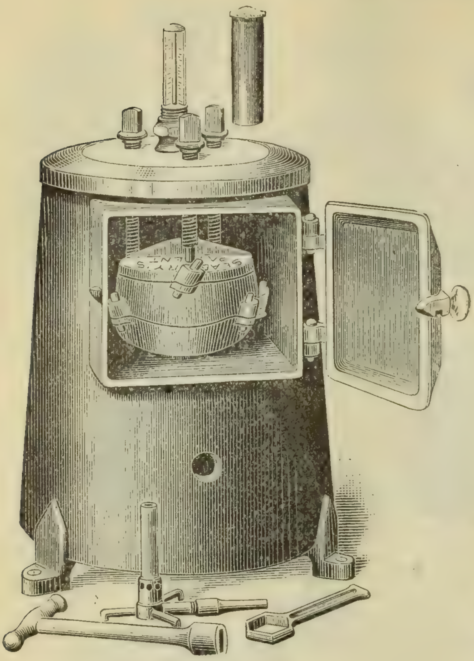
The illustrations show the Vulcanizer adapted for gas or alcohol, and for kerosene.

PRICES.

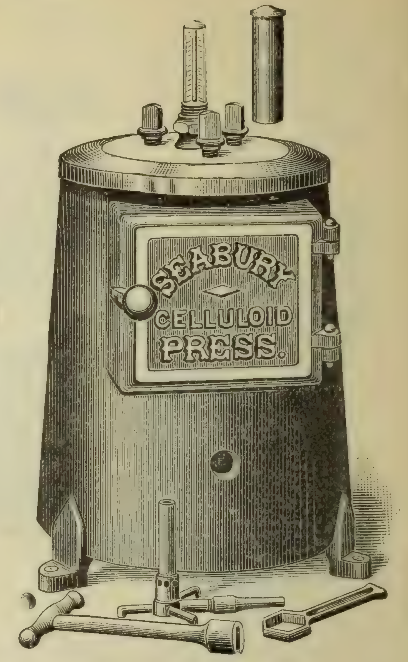
Two-Case Vulcanizer, for Alcohol or Gas	$24.00
" " " Kerosene	25.00
Three-Case " " Alcohol or Gas	26.00
" " " Kerosene	27.00

The Seabury Dry-Heat Celluloid Apparatus.

Patented December 30, 1890.



OPEN.



CLOSED.

Dr. Seabury, who has spent much time and labor in experimenting in the working of celluloid, reaches the conclusion that it should be molded in a dry chamber. The apparatus above shown was devised to carry out his ideas as to the proper method of manipulation. The molding-chamber is heated by dry heat, which is under perfect control.

One of the most important features is the flask, which is made of bronze and contains a number of devices found desirable in working celluloid. The guide-pins are made inclined and removable, to facilitate opening the flask and prevent the plaster investment from being broken. The flask is closed by three screws passing through the roof of the molding-chamber. The pressure can thus be adjusted exactly to the needs of the case in hand, so as to produce a dense plate.

Dr. Seabury claims that, properly manipulated, celluloid is the lightest, strongest, cleanest, and healthiest base for artificial dentures ; and that it is easily adapted, readily repaired, and durable.

PRICE.

Apparatus, complete, including Inclined-Guide Removable-Pin Lock-Flask, two Wrenches, and Gas-Burner . .	$20.00
Extra Flasks . . . . each	5.00

Directions for Operating the Seabury Celluloid Heater.

After the denture has been properly flasked, remove the wax trial plate and clean the surface by pouring a stream of hot water over it. Place the flask top side down in the oven.

It will take about thirty-five minutes to raise the heat to 320 degrees, at which point it should be kept forty minutes. If the machine is hot when the flask is placed in it, let it remain one hour only. If on applying a wet finger to the rim or side of the flask there is a hiss, it is too hot. Let it stand for a few minutes. When sufficiently cool, place the flask containing the celluloid blank between the two parts of the flask in the heater. Apply pressure very gently at first. The flame may now be lowered. In from ten to twenty minutes the flask will close. In any case do not continue the heat in the machine longer than ten minutes after beginning to close the flask.

When the flask is closed and locked, remove from the oven and place it in a bench vise until it is thoroughly cold, if it requires two or three hours. Then immerse in water until the plaster is softened ; this will avoid breaking the teeth, bending the plate, etc.

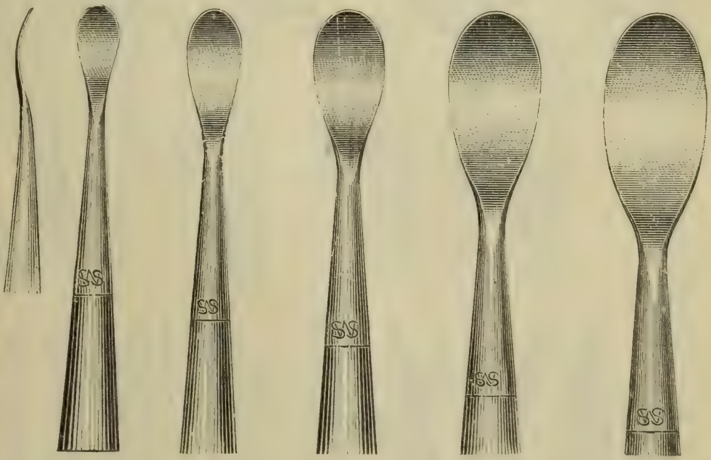
TO REPLACE A BROKEN TOOTH.

Select a tooth, cover the pins with an excess of paraffin, place it (paraffin up) in lower half of a flask filled with plaster ; fill the upper half of the flask with plaster, open the flask and remove the paraffin ; heat the investment and melt a piece of celluloid on to the tooth the same as if you were molding a whole denture.

Enlarge the cavity left by the broken tooth on the lingual side. After grinding the tooth and shaping the celluloid until it fits perfectly, cement it in place with liquid celluloid. The union of the celluloid will be perfect, and the tooth will be held as firmly in place as any tooth in the plate.

VULCANITE FINISHERS.

From Patterns furnished to us by Dr. N. W. KINGSLEY.



These tools are superior to ordinary chisel-edged scrapers. The handles are formed to suit the hand and steady the blade in using its edge to cut instead of scraping.

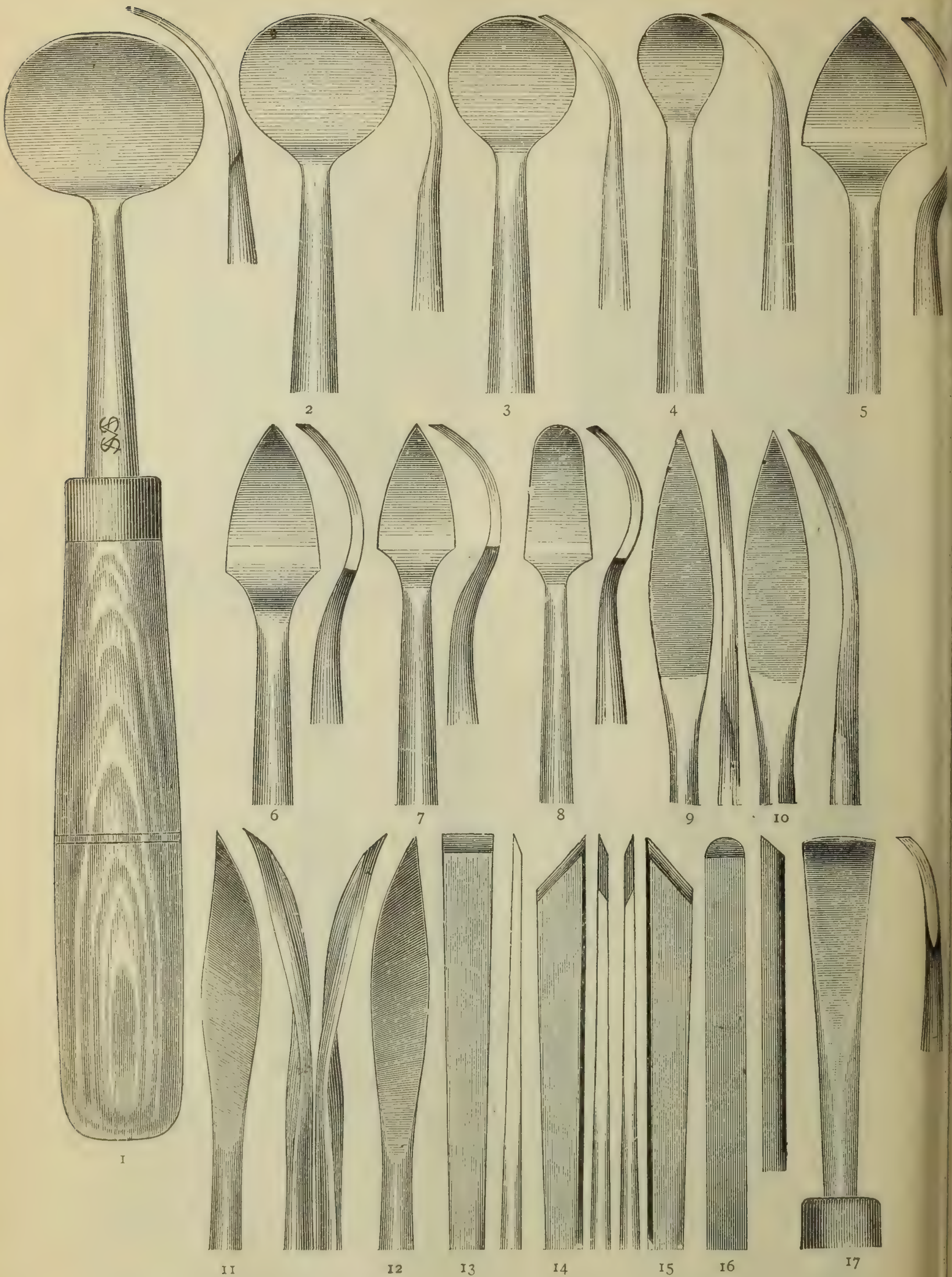
The tool has a rounded or convex back, with thin edges ; it will not cut in, but will remove superfluous stuff, and carve the surface smoothly and rapidly. They do not get dull so fast as scrapers, and are more easily ground. In short, this is a set of special tools designed and suited for the special use. In the regular set the ferrule joints are shouldered even with the steel and wood, as shown in the cut.

We supply the same form of handle, with blades driven in, at a reduced price.

PRICES.

Fine Handles, Smooth Shouldered Joints, as in the cuts	each	$0.50
With Driven Blades	"	.30

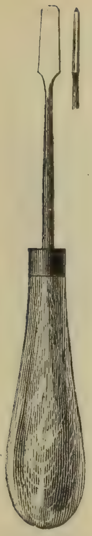
VULCANITE SCRAPERS.



Light Wood Handles, No. 1	40 cents.
" " " Nos. 2 to 17	each 25 "

VULCANITE PACKERS.

SET OF FIVE.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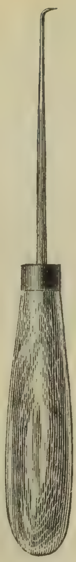
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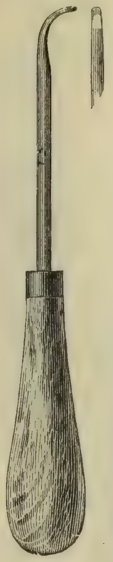
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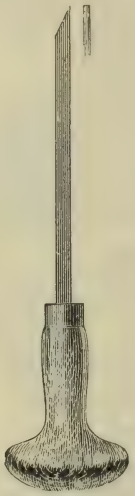
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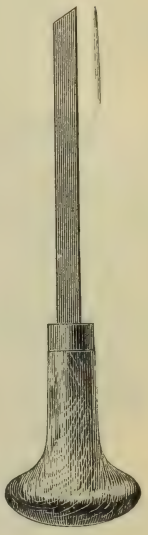
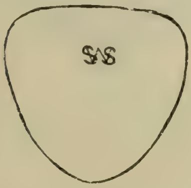

5

Price . . . . each 25 cents.

AIR-CHAMBER PATTERNS.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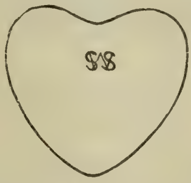
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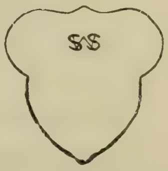
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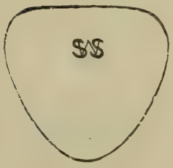
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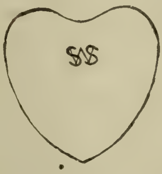
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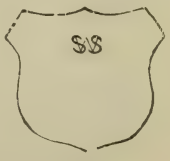
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Thick.

Thin.

Each form of our Air-Chamber Patterns is made in both thicknesses, affording practically a choice of twelve styles. They are put up in boxes containing a dozen each, either of separate numbers or assorted thin or assorted thick.

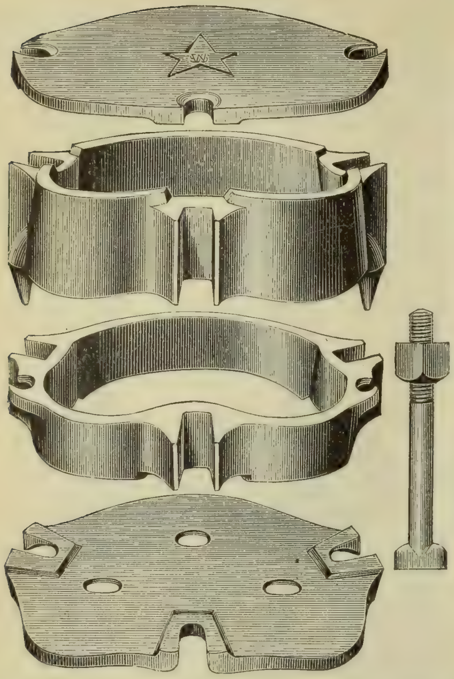
Price, Thick . . . . per doz. 25 cents.

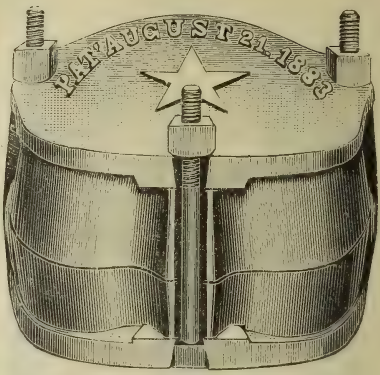
" Thin . . . . " 20 "

The Improved Star Reversible Flask.

Patented August 21, 1883.

REDUCTION IN PRICE.





The rings are of different widths, either of them fitting the top or bottom accurately, as may be required. The narrow ring is used next to the bottom plate, for whole dentures, where the parting is at the rim of the plate. By using the wide ring next to the bottom, an admirable Flask is obtained for deep cases and partial sets, or where the artificial gum rests on the natural. The bottom has three countersunk holes, through which the plaster runs, and when set holds the accompanying ring securely. The fastenings of the Flask are T-shaped at one end, and fit the slots in the bottom plate; and being free at both ends, are easily adjusted. The Flask being in four pieces, the plaster is removed without trouble.

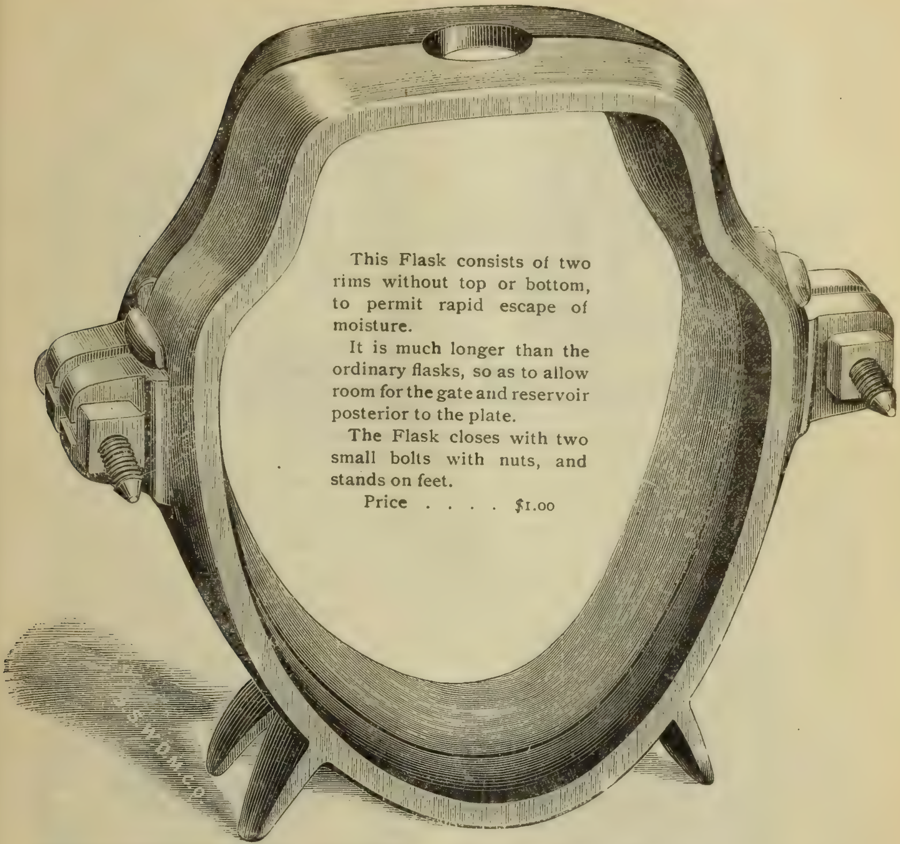
Price, Brass	$1.25
" Malleable Iron, Nickel-plated	.80

THE IDEAL DENTAL BASE PLATE.

Having purchased the formula for making the Ideal Base Plate from Dr. Head, it is now made under our own supervision, and may be relied upon to meet all the requirements suggested by its name. It is quickly softened in boiling water or over a spirit lamp. It is easily molded to fit the cast as closely as a vulcanite plate It hardens in a few minutes, and then is nearly as stiff as a metal plate. When soft it can be cut with shears; when hard it can be trimmed with files. For trial plates it is unequaled. The heat of the mouth does not soften it, and it retains its form like a metal plate.

Price per Box of 1 dozen Sheets . . . . . 50 cents.

Weston's Improved Flask.



This Flask consists of two rims without top or bottom, to permit rapid escape of moisture.

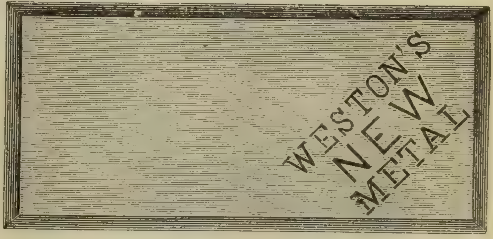
It is much longer than the ordinary flasks, so as to allow room for the gate and reservoir posterior to the plate.

The Flask closes with two small bolts with nuts, and stands on feet.

Price $1.00

THE BEST LOWER DENTURE.

WESTON'S NEW METAL.



This alloy is superior to any other material used as a base for lower dentures, because of its absolute freedom from liability to warp or spring; because of its cleanliness—the joints are so tight that teeth broken from the plate after years of actual wear do not show a trace of deposit between them and the alloy backing; and because of its perfect adaptation and its weight. It is entirely tasteless and harmless in the mouth, contains no poisonous metals, such as antimony, lead, zinc, or copper, and plates made of it can be duplicated or repaired at a trifling cost.

Send stamp for small sample plate and instructions. Put up in ⅛-lb. ingots.

Price, Metal	per ingot	$1.00
" Solder	per oz.	1.00

THE GRISWOLD FLASK.

Fig. 1.

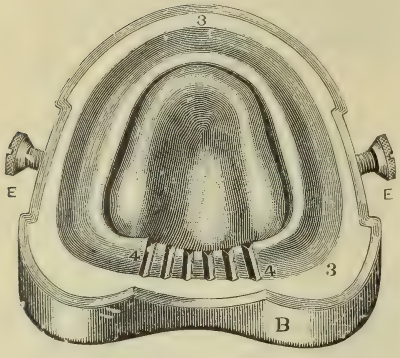


Fig. 2.

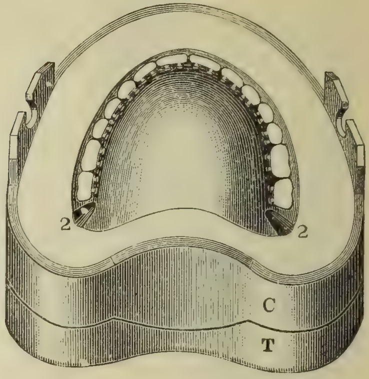


Fig. 4.

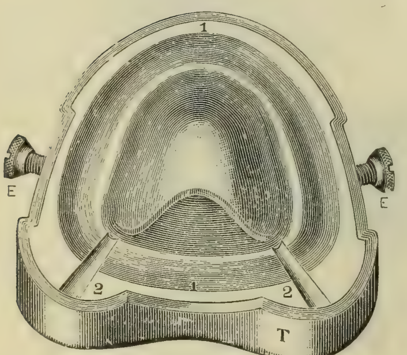


Fig. 5.

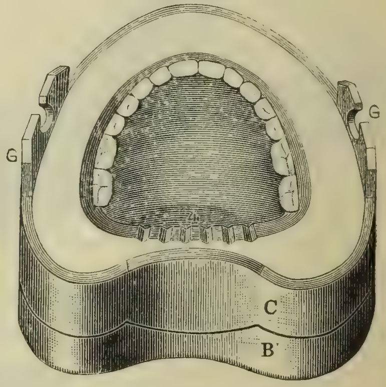


Fig. 3.

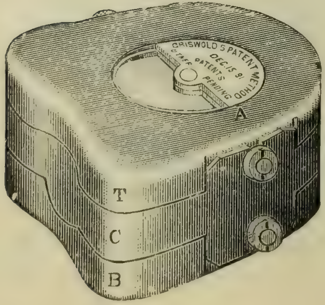
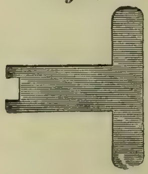


Fig. 6.



THE GRISWOLD FLASK AND METHOD.

Patented December 15, 1891.

This is at once the finest, strongest, and most capacious flask on the market. It is made of $\frac{3}{32}$-inch rolled brass, the base and top being shaped under tons of pressure over steel dies, which leave the flask polished inside and outside and of uniform thickness. The equal thickness, fine form, and flawless metal (impossible in cast metal) insures four new and important flask features : 1st, greatest strength ; 2d, greatest capacity, 3½ x 3 x 2 inches inside ; 3d, enters smallest vulcanizer ; 4th, transmits equal heat to every part of the investment to equally vulcanize every part of the plate at the same time. It is by far the best flask for every well-known method of flasking, but is especially adapted to the Griswold method, briefly described as follows : Put the waxed-up model in the base B, Fig. 1, level the plaster to the gum and palate edge line as shown, and varnish the surface. Lock the center C, Fig. 2, on the base B, by turning the coned nuts E, E, Fig. 1. Soap-lather the varnished surface to the gum and palate edge line, pour and level the plaster to cover the ends of the teeth, and slope the plaster up from the palate edge to the center C rear edge, Fig. 2. Soap lather the varnished plaster and the waxed-up surfaces, lock the top T on the center C, as in Fig. 3, and pour plaster through the hole in the top, jarring the flask to insure its being filled, and turn the half disk to close the top.

Unlock, warm, and separate the flask, and scrape grooves for surplus rubber as 1 and 2 in the top T, Fig. 4, and 3 and 4 in the base B, Fig. 1. Remove the wax with boiling water, lock T on C, Fig. 2, pack pink rubber neatly for labial and buccal gum surfaces, press T, C on B, and lock them together as seen in Fig. 3. The top of the flask should not be removed nor grooves 1 and 2 cut until after the wax has been removed, the pink rubber packed, and the base locked to the center. Now separate T, Fig. 4, from C, B, and pack the red or black rubber under the teeth and over their backs and the palatal part (see Fig. 5). Soap-lather the palatal part of the top T, Fig. 4, put it on C, Fig. 5, close them under the press, and lock as in Fig. 3. If too much rubber has been packed to permit closing, the soaped plaster will not stick to the rubber when T is separated from C to remove the excess of rubber ; the flask may then be closed, pressed, and locked for vulcanizing a perfect plate. The flask parts are accurately interchangeable, and by locking the center C on the base B, a deep base is formed for flasking partial cases in the way shown in Fig. 5, so that the artificial teeth are not separated from between the (natural) plaster teeth and cast at the risk of breaking the plaster or displacing the artificial teeth, as is often done ; but by packing and pressing the rubber from behind, and carefully pressing and locking the top T, Fig. 4, on C, Fig. 5, a perfect fitting and articulating partial plate is produced.

Whatever the method employed, the Griswold Flask will prove indispensable to the maker of first-class vulcanite dentures. Not the least of its excellences is the ease with which its polished surface may be quickly cleaned for ready use and the neat handling suited to its handsome appearance and style.

Fig. 6 represents the screw-driver for turning the locking nuts.

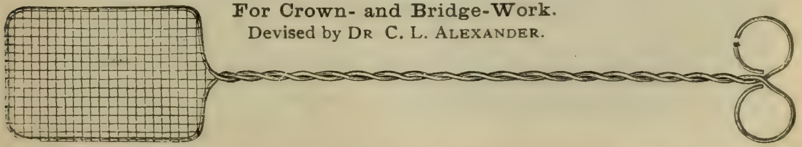
PRICE.

Griswold Flask . . . . each $2.00

WIRE SOLDERING FRAME.

For Crown- and Bridge-Work.

Devised by Dr C. L. Alexander.



Place the crown to be soldered on the Wire Frame and hold over the Bunsen flame, which will pass through the meshes and all around the crown to quickly and evenly solder it without changing its shape.

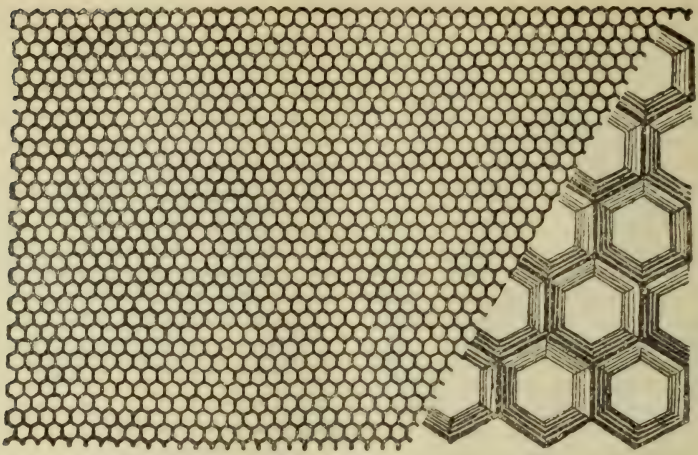
A small bridge piece may be invested on the Frame for heating up and soldering, which the long handle comfortably facilitates. Other uses of the device will readily suggest themselves.

PRICE.

Wire Soldering Frame . . . . each 15 cents.

COMBINATION DENTURES.

Invented by Dr. R. WÜNSCHE, Annaburg, Germany.



This is a perforated metal plate, by the use of which, in combination with rubber, dental plates may be made much thinner than if made of rubber only.

It is perhaps not too much to say that combination plates of this material may be one-half the thickness of pure rubber and yet be twice as strong.

The cut shows the full size of the plates. A part of the plate on the right shows the perforations as they appear under a strong magnifier.

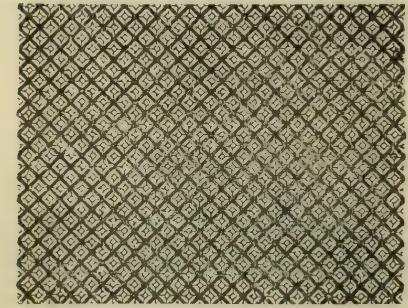
It will be seen that the holes are countersunk, so that when the rubber is forced through it forms a head or clinch on the face of the plate, making it impossible to detach the plate by any ordinary force.

Each box of plates will contain full directions, with illustrations of their application to whole and partial dentures.

PRICES.

No. 1, Aluminum Plates	each	$0 35
" " "	per box of six	2.00
No. 2, Victoria Metal Plates (gold colored) . .	each	.60
" " " " " " .	per box of six	3.50

Dr. Wünsche's Metal Adhesion Plates.



These plates are of very strong white metal, enabling the dentist to dispense with the vacuum-chamber in upper dentures, besides adding very much to the strength of the case.

The material is sufficiently hard to prevent the flattening of the convexities under any necessary pressure.

Each box will contain full directions.

Price	per box of six 25 cents.
"	each 5 "

SOFT SOLDER.

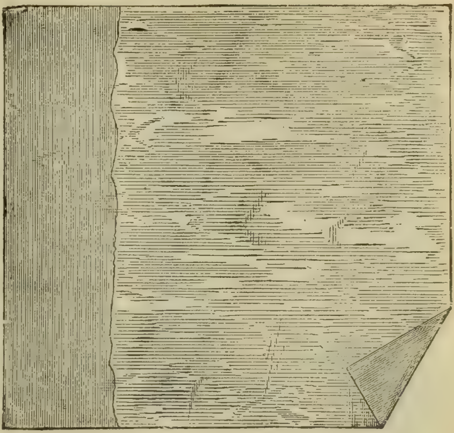
A good Soft Solder is often useful about the laboratory for odd jobs, such as fastening an engine-cable to the pulley-spindle. This which we offer is good and clean. Sold in 1-ounce strips.

Price . . . . per strip 8 cents.

THE VULCAN GOLD LINING.

A PERFECT GOLD COVERING FOR RUBBER PLATES.

PATENT APPLIED FOR.



In this Gold Lining we claim advantages over others as follows:

The Gold is applied in one piece to the surface to be covered.

No extra care is required in packing the flask.

The Lining is composed of chemically pure Gold with a thin covering of pure Silver. The union between the rubber plate and the Gold Lining is mechanical; the sulphur in the rubber when set free by the action of vulcanizing corroding the surface of the silver, to which the rubber adheres perfectly. The sheets are of the thickness of No. 20 foil, and each book contains about forty-eight (48) square inches,—more than enough to cover six ordinary size plates on one side, or four plates on both sides. Having received occasional requests for a heavier lining, we are prepared to supply it of the thickness of No. 40,—the books containing half the number of square inches of the No. 20

If the rubber plate is covered on both sides it is tougher when vulcanized, for the reason that during this process the pressure against the metal gives the plate a surface more dense than it will have if vulcanized in contact with plaster.

Price . . . . per package $5.00

Surface-Cohesion Forms for Artificial Dentures.

Invention of Dr. Joseph Spyer. Patented January 6, 1885; December 8, 1885.

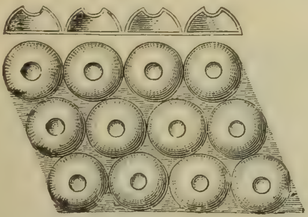


FIG. 2.

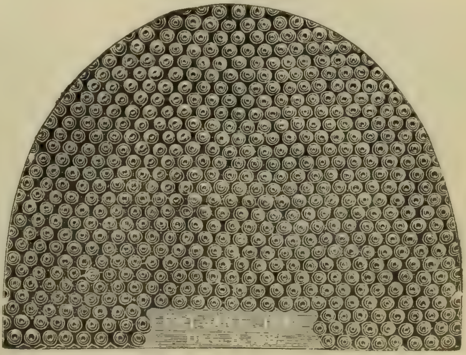


FIG. 1.

A thin metallic Form, the surface of which is covered with minute papilliform prominences—shown in Fig. 2 magnified four diameters—which by displacement of mucus at the points of gum contact effect surface cohesion as if the denture were glued to the gums, yet cause no irritation and leave no marked indentations. Adapted for either upper or lower plates. By the aid of this device strong cohesion can be had with a narrow plate, and thus the sense of taste be left unimpaired. Lower plates so made are very firm. Put up in packages containing one dozen Forms size of Fig. 1, which can be cut for either upper or lower plates. Full directions accompany each package.

For use as a lining for rubber or celluloid dentures these Forms are made of Gold with one side covered with a thin layer of Silver. In vulcanizing the surface of the Silver is corroded by the free sulphur, causing it to adhere to the rubber tenaciously. Thickness of 120 foil.

PRICES.

Surface Cohesion Forms, per box of one dozen	$0.25
Lining Forms . . . . each	2.50
Rubber Cement . . . . per bottle	.25

SPYER'S AUTOMATIC SUCTION CAVITY.

The only device ever invented that will enable the dentist to construct a narrow plate with perfect adhesion.

Patented in the United States, England, France, Germany, and Canada, September 4, 1894.

Fig. 1.

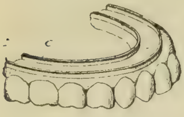


Fig. 2.

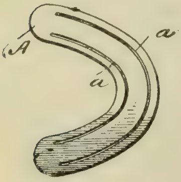


Fig. 3.

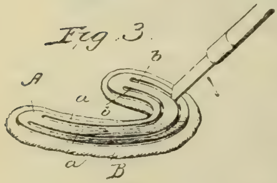


Fig. 1 is a view of a finished plate. Fig. 2 is a view of the Automatic Suction Cavity. Fig. 3 shows the method of using the same.

The Suction Cavities come already shaped for the model, but it is necessary to trim down with curved scissors to meet the requirements of each particular case, always leaving a slight space between the slots or openings *a a*, Fig. 2, and the outer margin of the metal form.

The Suction Cavity is then secured by means of pins, or by varnish or mucilage or any sticky substance, to the plaster model. A sharp instrument is then passed through the slots *a a*, Fig. 2, in the manner indicated in Fig. 3, and carried their entire length, forming parallel grooves in the plaster model. Then the base plate is put on over the Suction Cavity, the teeth are set up as usual, the case flasked, packed and vulcanized in the usual way.

After vulcanizing the metal form *is removed.* If the parallel ridges *c c*, Fig. 1, are too high after the plate is vulcanized, file them down to the desired height.

The finished plate will have along the edge of its palatal surface the parallel ridges *c c*, Fig. 1, besides the form of the suction, which provides strong adhesion from end to end of the plate.

Price . . . . per box $1.00

THE S. S. WHITE DENTAL MFG. CO., Agent.

JOSEPH SPYER, D.D.S., Inventor and Patentee.
Principal Office and Factory; 182 and 184 Broadway, New York.

ASBESTOS MAT.

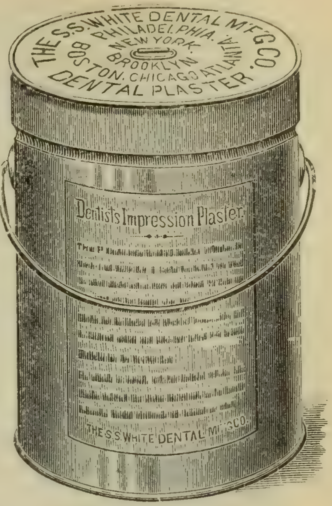
THE S. S. WHITE DENTAL MFG. CO.
SSW

This is a solid Asbestos Mat, about one-quarter of an inch thick, and will perfectly protect the laboratory table when soldering or vulcanizing. It is made in two sizes.

Price, 9 inches diameter . . . . each 15 cents.
" 4½ " " . . . . " 8 "

DENTISTS' PLASTER.

FOR TAKING IMPRESSIONS AND MAKING CASTS.


THE S.S. WHITE DENTAL M'F'G CO.
PHILADELPHIA
NEW YORK
BOSTON
BROOKLYN
CHICAGO
ATLANTA
DENTAL PLASTER
Dentists Impression Plaster
THE S.S. WHITE DENTAL M'F'G CO.

Our Dentists' Plaster has two points of superiority: Quality and honest dealing. Its quality needs no exploiting. It is known. With regard to the other point, a word may not be out of place. For a barrel we sell 300 lbs.; for a half-barrel, 150 lbs.; for a quarter-barrel, 75 lbs. The packages are never less, frequently more, and then the buyer gets the advantage. Our cans are packed by machinery, and contain the quantity they are advertised to contain every time; they have the name, etc., stamped in the lid as shown.

PRICES.

Two-Quart Can	$0.30	Three-Peck Can	$2.00
Six-Quart Can	.70	Quarter-Barrel	1.60
Twelve-Quart Can	1.15	Half-Barrel	2.50
Half-Bushel Can	1.45	Barrel	3.50

These are the prices at Philadelphia. Freight and expenses added when sold at other depots. Boxing on cans, and porterage, extra.

RUBBER BOWLS FOR MIXING PLASTER.

A

B

C

These Bowls are made of soft vulcanized rubber thick enough to give all the strength and rigidity required. They cannot be broken; their sides can be pressed together to form a lip or spout for pouring thin-mixed plaster; and any unused plaster of the mixing which sets in them can be thoroughly crushed and readily removed by squeezing the sides of the Bowls together.

The superiority of the Rubber Plaster Bowls is attested by the fact that they have made for themselves a place in almost every dental laboratory.

They are designated as A, B, C,—A smallest, B medium, and C the largest. The dimensions are: A, 3¼ inches in diameter at the top by 2¼ inches in depth; B, 4 inches in diameter by 2¾ inches in depth; and C, 4½ inches in diameter by 3½ inches in depth.

PRICES.

Rubber Plaster Bowl, A	each	$0.50
" " " B	"	.60
" " " C	"	.80

MODELLING COMPOSITION.

Formerly our Modelling Composition was made in circular disks in four varieties of temper and working qualities. Long experience having shown that only one of these had special fitness for the needs of dentists, we have decided to hereafter make only this one, namely, that which has been known as the Medium or No. 2, the sales of which have so largely exceeded those of the other three combined as to settle the question of preference beyond a peradventure. With this decision comes also a change of form. Hereafter our Modelling Composition will be put up in "cakes" as per illustration.

Put up in half-pound enameled metal boxes.

Price, per box . . . . 50 cents.

CHARLES ABBEY & SONS,

MANUFACTURERS OF

DENTISTS' FINE GOLD FOIL,

Nos. 228 and 230 Pear Street, Philadelphia.

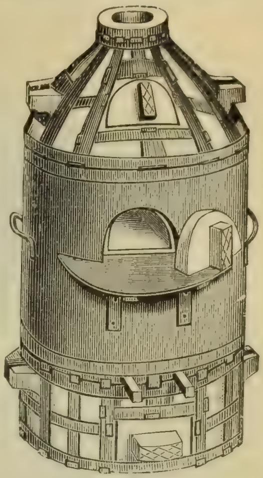
The attention of Dentists is invited to our FINE GOLD FOIL, which is prepared under our constant personal supervision. Our Nos. are **4, 5, 6,** and **8.**

We are also manufacturing COHESIVE FINE GOLD FOIL, Nos. **4, 5,** and **6.**

ALL our Gold Foil is manufactured from ABSOLUTELY PURE GOLD, prepared expressly for the purpose, with great care, by ourselves.

ADDRESS **CHARLES ABBEY & SONS, Philadelphia.**

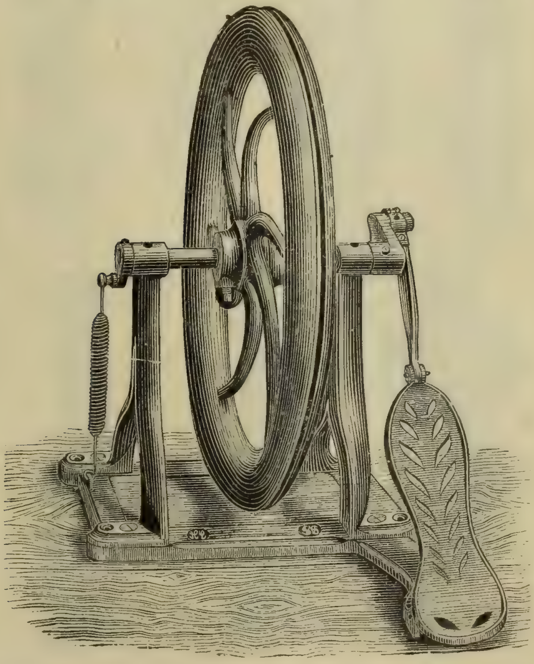
The Model Furnace for Continuous-Gum Work.



This Furnace will give entire satisfaction when coke is used for fuel. It is a decided improvement over any heretofore manufactured for this purpose, as the fire-pit below the muffle is of sufficient capacity to insure a perfect result at each baking. The part which is subjected to the greatest heat is free from angles and incased with sheet iron, rendering it less liable to crack from long use. The fire or ashes may be withdrawn by removing the two projecting grate-bars. It is 24 inches high and 12¼ inches in diameter.

Price of Furnace and two Muffles, one pair Tongs, and a Poker . . .	$25.00
Boxing	1.00

THE LAWRENCE DRIVING-WHEEL.

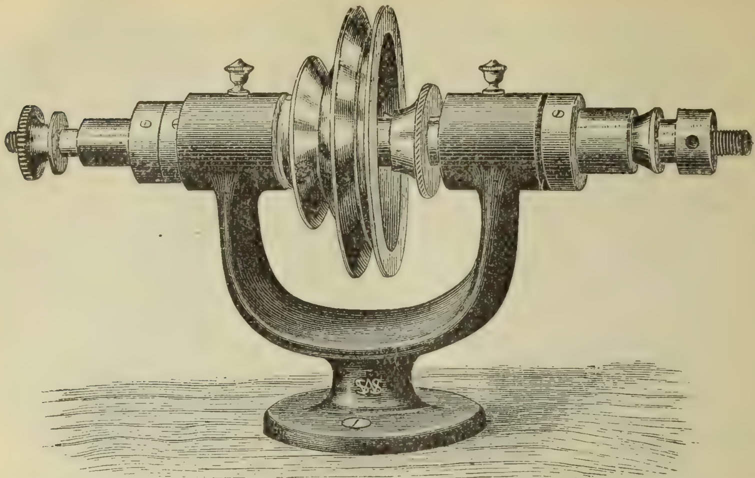


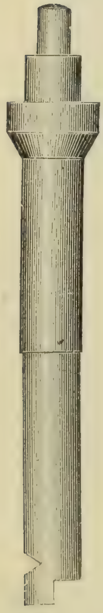
The Lawrence Driving-Wheel (No. 1) has had a larger sale than any other motive power for dentists' use. The diameter of the Driving-Wheel is 18½ inches. The foot-power is placed on the floor under a table or shelf, with the Lathe Head directly over it. The cuts show the style of the apparatus as now made. All the parts of the Lathe are superior in workmanship and adaptation.

Price	$12.00
Boxing	1.00

CLUTCH LATHE-HEAD, WITH CONE-JOURNALS AND CONE-MANDRELS.

Patented March 7, 1882.

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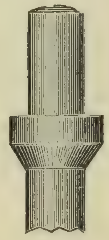
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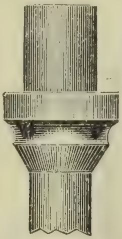
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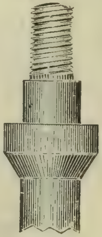
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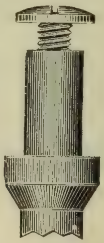
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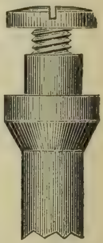
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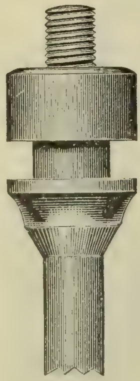
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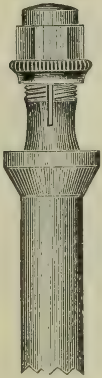
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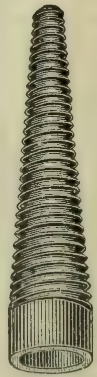
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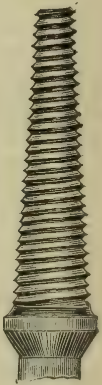
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The Clutch Lathe-Head has practically demonstrated its superiority for dental laboratory purposes by years of successful, satisfactory use.

It runs true. It is carefully made, and both the spindle and the mandrels have long bearings, which, being cone-journaled, take up lost motion from wear by simply tightening the screw-collar.

It is adjusted quickly. The mandrels being held by a latch operated by a sliding collar working upon a cam, can be inserted or removed in an instant.

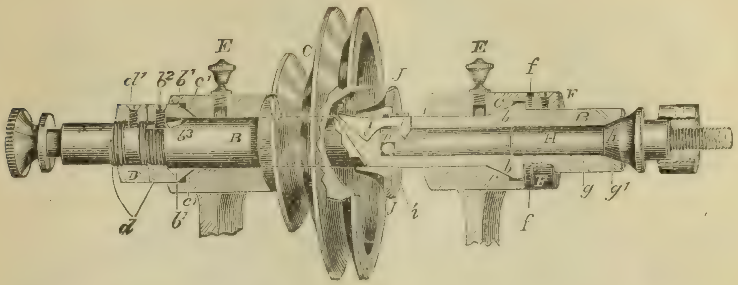
It is durable. The construction throughout is substantial, and gritty particles have little opportunity to work into the bearings and cut them out.

The pulley-grooves at bottom are $1\frac{5}{16}$ and $2\frac{1}{4}$ inches diameter.

All the bright parts are nickel-plated; the frame-work japanned.

We supply a complete set of mandrels, but those who have our chucks for the Lawrence or Laboratory Lathes need purchase only No. 4 of the Clutch set.

Clutch Lathe-Head, with Cone-Journals and Cone-Mandrels.



The spindle *B* is provided with cone-journals *b*, b^1 (the first fixed, the second movable) which fit corresponding cone-seats in the bearings *c*, c^1. The journal b^1 is formed by a cone-collar, which is adjustable longitudinally upon the spindle to take up wear of either the spindle, its bearings, or the chucks, by means of the screw-ring *D*. The screw-ring works on threads cut in the spindle, and is held in position by the set screw d^1. The collar is prevented from turning upon the spindle by the guide-screw b^2, which passes through the collar into the groove b^3.

The bit *H* has a conical shoulder at its outer end, which fits in a corresponding seat in the spindle. The inner end is cut partly away to pass the carrier-pin i^1, and provided with a groove h^2, into which the wedge-end *i* of the pivoted latch *I* drops. The latch is then locked by sliding up the collar *J* (which while round outside is an eccentric inside) until its eccentric recess is over the raised portion, and then turning it either way till it binds. In sliding the collar upon the latch make sure that the file-cut nick in the collar-rim is exactly over the latch.

An adjustable collar *F* holds a leather washer over the annular shoulder formed by the bearing *c*, effectually preventing the entrance of gritty particles to cut the bearing out. The oil-holes are covered with nickel-plated screw-caps *E*, *E*. All the bright parts are nickel-plated ; the frame-work japanned.

Mandrel No. 1 will carry corundum wheels Nos. 00 to 4. }
" " 2 " " " " 5, 6, 7. } the wheels to be shellacked to the chucks.
" " 3 " " " " 8, 9, 10. }
" " 4 " any of the Laboratory Lathe Chucks.
" " 5 " corundum wheels Nos. 5, 6, 7, ½ inch thick and over.
" " 6 " " " " 5, 6, 7, ¼ " to ½ inch thick.
" " 7 " large corundum wheels Nos. 8, 9, 10 ; brush wheels, cotton wheels, etc.
" " 8 " engine-bits (please state for which Hand-piece).
" " 9 " screw-cone, left-hand thread, for the left side of Lathe, for brush wheels, felt wheels, cones, etc.
" " 10 " screw-cone, for right-hand side of Lathe, for brush wheels, felt wheels, cones, etc.

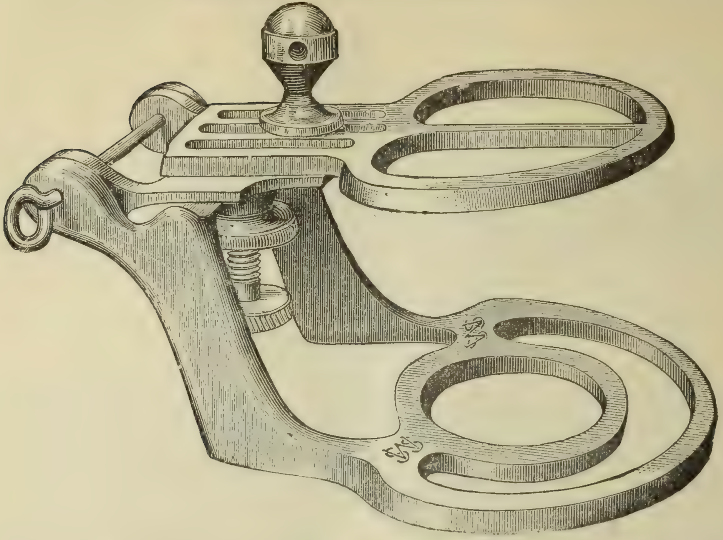
PRICES.

Head, complete, with 10 Mandrels		$13.00

PARTS SEPARATELY.

Head, without Mandrels		$9.00
Mandrels Nos. 1, 2, 9	each	.25
" No. 3	"	.35
" " 4	"	.30
" Nos. 5 and 6	"	.45
" " 7 and 10	"	.60
" No. 8	"	1.00
" " 4 with thread for Lawrence Lathe Chucks	"	.30

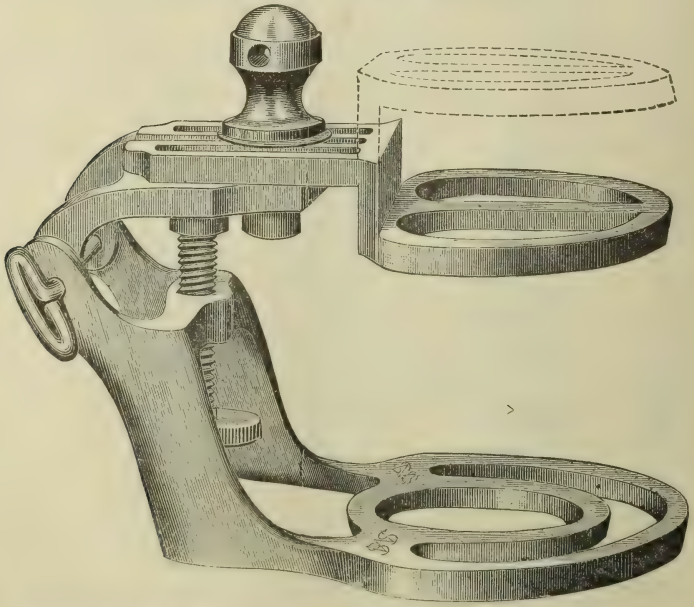
ARTICULATOR No. 2.



The standard Articulator. Made of brass, substantial, and nicely finished in all its parts, with a conveniently arranged set-screw and hinge, whereby the top plate can be thrown all the way back, or adjusted at any angle.

Price, Polished and Lacquered	$2.00
“ Nickel-plated	2.50

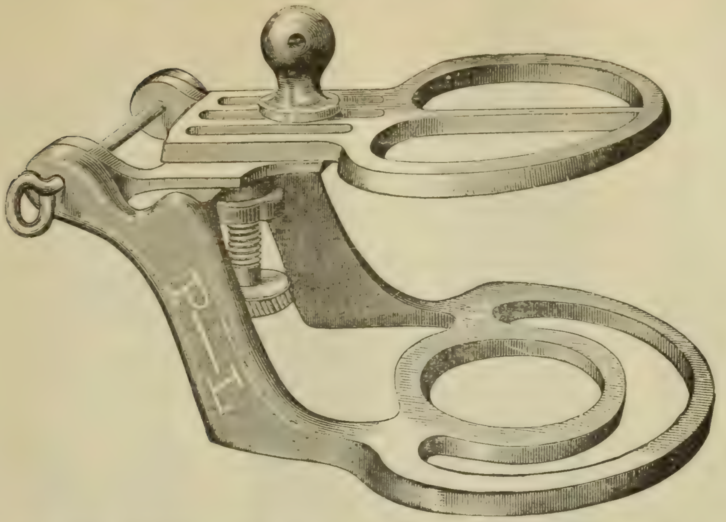
ARTICULATOR No. 6.



This Articulator is a modification of our No. 2, having all its movements. The modification consists in making the upper plate with a double bend, so that when reversed, as shown by the dotted lines in cut, the space between the plates is increased one inch, giving ample room for extra length of bite in upper and lower dentures.

Price, Polished and Lacquered	$2.00
“ Nickel-plated	2.50

PLAIN-LINE ARTICULATOR.



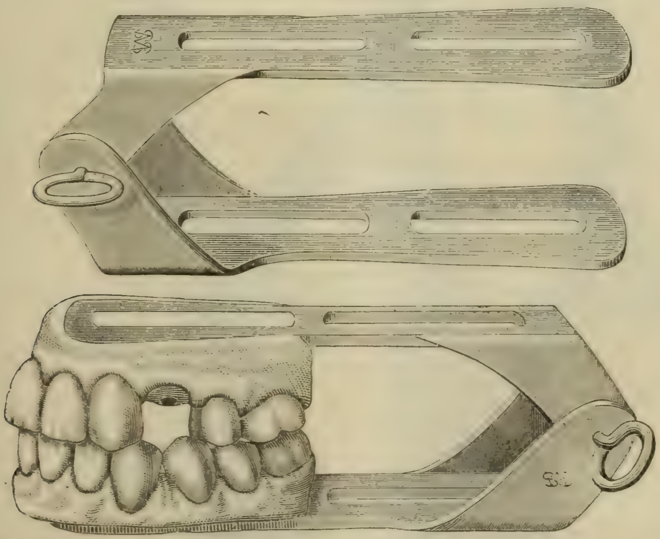
Of the same general design as No. 2, but not finished so well. Nickel-dipped. It is made to meet a demand for a low-priced article, and is fully equal, if not superior, to any offered elsewhere.

It is designated "Plain-Line."

Price	90 cents.

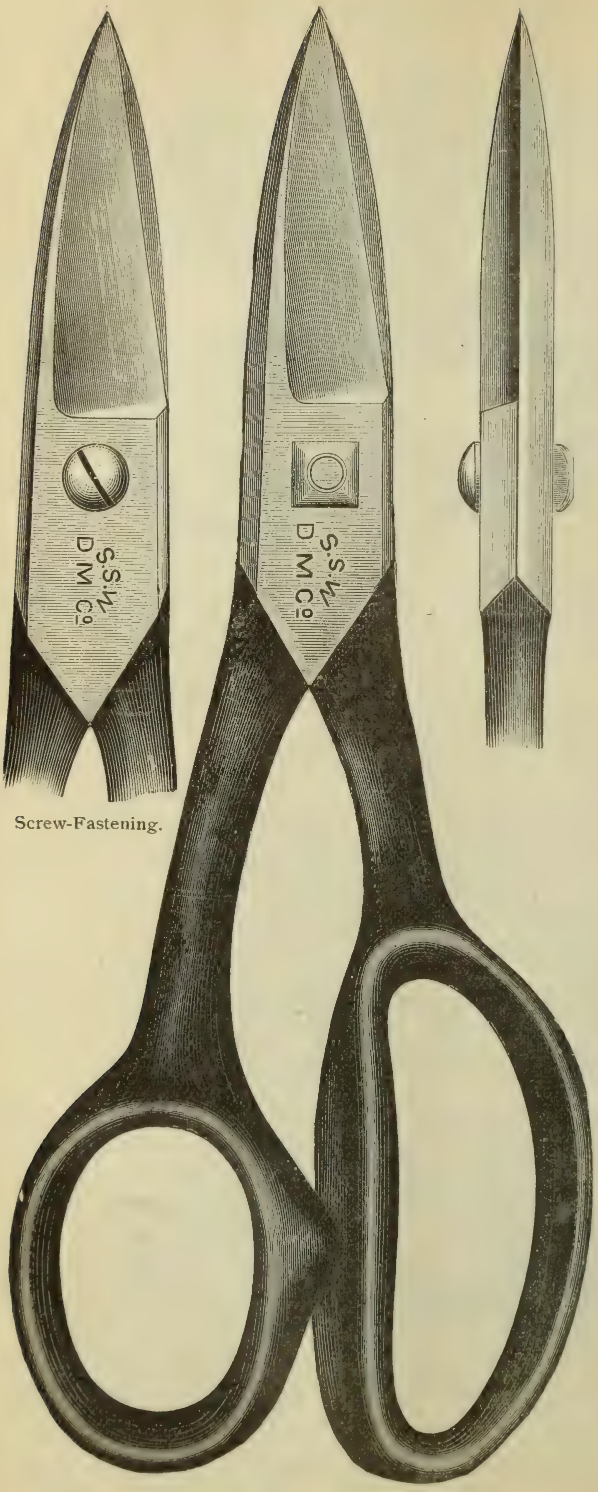
CROWN ARTICULATOR.

Suggested by Dr. P. G. C. Hunt.



This Articulator is particularly well adapted to the adjustment of small or partial dentures, as it affords a view of the palatal as well as the buccal faces of the teeth.

Price, Brass, Nickel-dipped	25 cents.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D M Co.
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Screw-Fastening.

Plate Shears.

These Plate Shears, bearing our name, have been demonstrated by years of use in the hands of our workmen to be the best upon the market. They are made specially for our sales, and the quality of materials and workmanship is of a high order.

They will cut metals readily up to No. 22 American Standard Gauge.

Every pair is warranted, and any showing flaws or defects will be cheerfully exchanged. As now made there is considerably more space between the handles, so that there is much less risk of pinching the fingers in use than with ordinary patterns.

Cuts are full size.

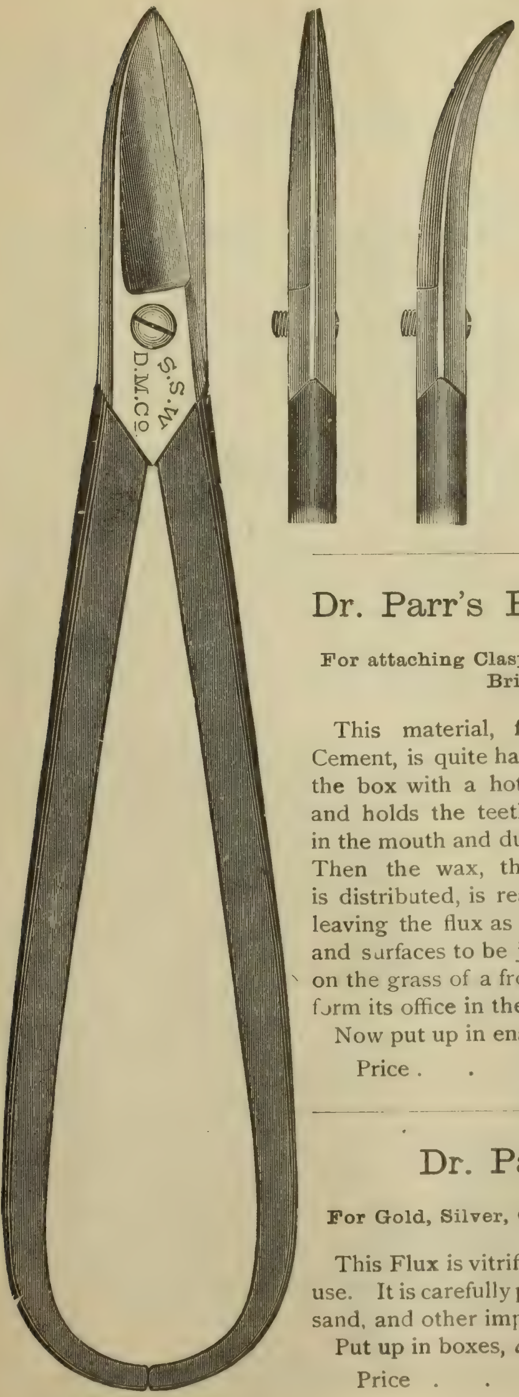
Two styles, Nut- and Screw-Fastening.

PRICES.

With Screw-Fastening, 75 cents a pair.

With Nut-Fastening, $1.00 a pair.

Plate Shears for Crown- and Bridge-Workers.



Designed especially to permit the delicacy and nicety of manipulation so frequently necessary in constructing crowns and bridges. To this end the blades are made short and strong, with small, neat points, and the handles light and relatively long, so as to afford ample leverage. Cuts are full size.

Made of solid steel, either straight or curved.

PRICE.

Straight .	per pair	$0.60
Curved .	"	.85

Dr. Parr's Hard Wax Flux,

For attaching Clasps and Teeth in Plate- and Bridge-Work.

This material, formerly known as Wax Cement, is quite hard, and must be taken from the box with a hot spatula. It sets quickly, and holds the teeth and clasp firmly for trial in the mouth and during subsequent soldering. Then the wax, throughout which the flux is distributed, is readily burned or melted out, leaving the flux as a deposit over the crevices and surfaces to be joined, much like the rime on the grass of a frosty morning, ready to perform its office in the soldering.

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In a critical review in the DENTAL COSMOS, Prof. C. N. Peirce says, "In its eighteen chapters on dental anatomy, tooth-development, and allied subjects, the general and special anatomy of the teeth are so fully discussed that little has been omitted which it would be profitable to read, and conversely little is contained therein which it would not, for the student especially, be desirable to know. . . .

"Chapter XL, upon caries of the teeth, is certainly creditable work. The writer has met with nothing on this subject from which the student could get a more intelligent description of the pathological process than by a careful reading and re-reading of this chapter. In this, as in those previously noticed, the beautiful illustrations add greatly to the interest of the text."

Dr. W. C. Barrett, in the *Dental Practitioner*, says, "It is impossible within the limits of an article like this to give a complete analysis of all the features of a work so comprehensive and yet so minute. It must be carefully studied as a whole before a fair idea of it can be obtained. No one can read it without having his ideas of the extent of dental practice materially enlarged. No one can study it without being impressed with the tireless patience and unwearied faithfulness of its author, as well as with his careful habits of observation. The critic may find passages and statements that he may antagonize, for histologists are not all in perfect accord on certain debatable points. But all must agree that this is one of the most notable contributions to dental literature that America has yet produced. In dental pathology nothing approaching it in completeness has yet been issued, and the dentist who has not carefully studied it cannot claim to be acquainted with the literature of his profession."

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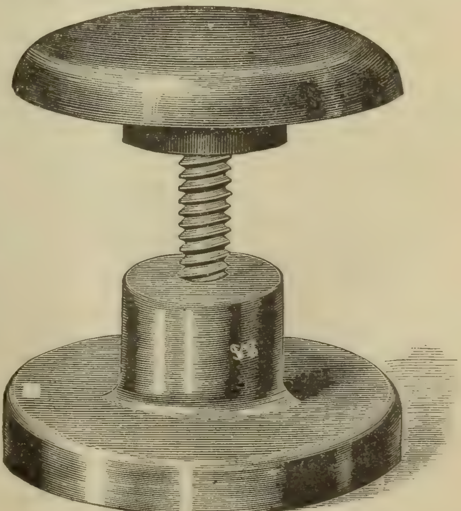

A useful auxiliary to the laboratory lathe. It affords an easy, comfortable support for the hand, as, for instance, in grinding teeth, and enables the operator to hold the work steadily against the corundum wheel of the lathe. It can be adjusted to the proper height by means of the screw. Made of metal, japanned.

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First Year (Freshman).—General plate-work in laboratory, and the preparation and filling of at least twenty-four cavities in extracted teeth with Tin foil, Gutta-percha, Zinc phosphate, and Amalgam. The cavities when prepared are to be shown to the demonstrators for criticism or approval, as also the fillings when completed. The best six of the entire number are to be mounted and deposited in the College museum. Any student failing to do the above work satisfactorily, will have his admission to the Junior Class conditioned on completion of it before the middle of the Junior term.

Second Year (Junior).—General plate-work and the making of the prescribed depositing plate, also the preparation of roots and the making and mounting of six dowel crowns, three hollow metal crowns, and a piece of bridge-work, including two or more suspended crowns, on teeth out of the mouth.

Third Year (Senior).—Making of practical case and the requisite graduation fillings. In special cases, subject to the approval of the Professor of Practice, a case of crown- or bridge-work (in the mouth) may be accepted in lieu of the practical plate. Hours for examination of practical work and graduation fillings, Mondays, Tuesdays, and Saturdays, from 10.30 A.M. to 12 M.

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FEES.

Matriculation Fee (paid once only)	$5.00	Dissecting Fee (Second Year) . .	$10.00
Fee for One Course of Lectures . .	100.00	Graduation Fee (Third Year) . .	30.00

Board can be obtained at from five to eight dollars per week, according to location and accommodations. In locations near the college, students generally pay about five dollars per week.

Students of the Dental Department have access without additional charge to all the other lectures and clinics in the Medical Deparment.

Surgical clinics at University Hospital twice a week; at Philadelphia Hospital, contiguous to the grounds of the University, Wednesday and Saturday.

University of Pennsylvania.—Dental Department.

The dental department possesses the means for thorough training, both theoretical and practical, not surpassed, it is believed, by any other institution. The operating-room is 140 feet in length by 40 feet in width, and lighted by windows on all sides. In front of each window is placed a Morrison Chair, a handsome nickel-plated movable bracket, and a neat walnut table. Battery wires are arranged to a number of the chairs for the use of electric pluggers.

The Mechanical Laboratory is supplied with all the modern appliances, and is under the care of an able and experienced mechanician. Special clinics will be given in continuous-gum and crown- and bridge-work.

The extensive Chemical Laboratories are under the charge of a demonstrator well qualified to meet all the requirements of his position.

The Dissecting-Room is large, well lighted, thoroughly ventilated, and is furnished with ample material for the successful prosecution of anatomical studies.

THE REGULAR OR WINTER SESSION.

The session will commence October 1, and ends at Commencement, early in June. The number of lectures per week, with a synopsis of the various branches taught, will be found in the General Catalogue.

In order to facilitate work in the practical departments, and to fully employ the student's time, the regular winter sessions are so arranged that the first-course student is required to devote the morning hours equally between *dental, histological, and chemical laboratory work.*

During the second and third years the student has the entire forenoon of each day for practical dental work. Ample opportunity is afforded for practice in operative and mechanical dentistry. In the latter branch, the students of the first year are divided into sections, thus devoting the time not otherwise engaged to practice in the operative and mechanical rooms.

It is believed that this plan of *grading the course*, and of affording the first-year student an opportunity of coming forward for examination in the branches of chemistry, histology, and materia medica, and the second-year student upon anatomy and physiology, will not only prove an economical arrangement of his time, but will really facilitate his labors in the acquirement of knowledge in the remaining branches.

PLAN OF EXAMINATIONS.

Attendance upon three regular courses of lectures will be required before the final examination for the degree of Doctor of Dental Surgery.

At the close of the first year, examinations are held in *chemistry, histology, and materia medica*, and the second year upon *anatomy* and *physiology.* If the student is not qualified, a second examination is afforded him at the beginning of the next winter session.

The final examination at the close of the third year is in *operative dentistry, mechanical dentistry, metallurgy, dental pathology and therapeutics.*

All applicants for advanced standing must pass the required examinations of this school, or furnish proof that they have passed *equivalent* examinations in some recognized dental or medical school. Graduates of a recognized medical college will be admitted to the second-year class without examination.

CONDITIONS OF ADMISSION.

Candidates for admission are required: *First*, to write an essay (not exceeding a page of foolscap) as a test of orthography and grammar. *Second*, to pass an examination in the English branches, viz: grammar, arithmetic, history, and geography.

A candidate who has received a collegiate degree or passed the matriculate examination of a recognized college, or who has a certificate from a normal, high, or grammar school, or a teacher's certificate properly attested, may enter without examination.

For information and announcements address

JAMES TRUMAN, D.D.S.,
Dean of the Dental Faculty, 3243 Chestnut Street,
PHILADELPHIA, PA.

Chicago College of Dental Surgery.

Dental Department of Lake Forest University.

The Annual Winter Course of Instruction will begin October 2, 1894, and end April 2, 1895.

Three full winter courses of lectures are required before graduation. Graduates of reputable pharmaceutical and undergraduates of medical colleges are admitted to the second-year course, and can become candidates for graduation after taking two winter courses of lectures.

GRADUATION IN MEDICINE.

Students who may desire to do so can (if found qualified) obtain the degrees in Dentistry and Medicine in four years.

Graduates of the Chicago College of Dental Surgery are excused from the lectures on anatomy, physiology, and chemistry, from chemical and histological laboratory work, and dissecting.

Students desiring to graduate in medicine are required to notify the Dean in writing of their intention at the beginning of their second course.

TOPICAL STATEMENT OF WORK.

FIRST YEAR.

During the Freshman year the studies taken up are Theoretical and Practical Chemistry and Anatomy, Histology, Operative and Prosthetic Technics and Operative and Prosthetic Dentistry and Physiology, and during the latter part of the term some practical work in the Infirmary.

SECOND YEAR.

In the Junior year the studies of the Freshman year are reviewed, and the student performs practical work in the laboratories and operates in the Infirmary.

THIRD YEAR.

During the third year the student listens to lectures on Oral Surgery, Materia Medica and Therapeutics, Pathology, Operative Dentistry, Dental Anatomy and Pathology, and Orthodontia. In addition to the lectures, each student is expected to operate in the Infirmary and perform practical work in the Laboratory.

Matriculation Fee, good to the close of the term . .	$5.00
General Ticket	100.00

There will be no separate fees for Chemical and Histological Laboratory work, Dissecting, and final examinations, as heretofore.

FEES FOR THE ANNUAL SPRING AND SUMMER INFIRMARY COURSE.

Matriculation Fee (good until the following April) . . .	$5.00
Tickets for the Course	20.00

This amount will be deducted from the fees of the next following winter session.

Instruments and appliances for clinical department will cost from $25 to $40.

Board, including light and fuel, can be obtained at a convenient distance from the College, at from $4 to $6 a week.

Students may be registered and secure seats in the lecture rooms at the opening of the sessions by sending a matriculation fee ($5.00) to the Dean at any earlier date, which will be credited to their annual fees.

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* A fee of $5 must be deposited to cover chemicals and breakage in the Chemical Laboratory.

Letters of inquiry should be addressed to

DR. TRUMAN W. BROPHY, Dean,
126 State Street, Chicago, Ill.

CHICAGO COLLEGE OF DENTAL SURGERY

THE COLLEGE BUILDING.

The new college building occupies a prominent position among a group of fourteen others, comprising medical colleges, hospitals, and schools.

The lot on which the building stands has a frontage of eighty-five feet, and a depth of one hundred and twenty feet. It is a five-story and basement structure, the basement and first story being of rock-faced Bedford stone, and the superstructure of pressed brick and terra-cotta, with terra-cotta trimmings.

The building has two entrances, the main one through a large cut stone doorway surmounted by a stone arch beautifully ornamented with carved work. The interior is finished in hard wood, according to the latest idea of elegance, convenience, and comfort.

The entire six floors of the building are divided up into lecture rooms, class rooms, clinic rooms, etc., with the exception of the second floor, which is devoted to the Dental Infirmary. The chief lecture room has a seating capacity for four hundred and fifty students. There is also a dissecting room, thoroughly equipped with all the requisites for the study of human anatomy.

There are Histological, Chemical, Bacteriological Laboratories, also Laboratories for the study of Operative and Prosthetic Technics, and one for the construction of artificial dentures.

The building occupied by the Chicago College of Dental Surgery is, in all its appointments, one of the most perfect and complete of its kind.

Letters of inquiry should be addressed to

DR. TRUMAN W. BROPHY, Dean,

126 State Street, Chicago, Ill.

New York College of Dentistry,

205-7 East Twenty-third Street.

NEW YORK, U. S. A.

Collegiate year March 1 to March 1.

Infirmary Course of Practical Dental Surgery
March 1 to October 1.

Fall and Winter Session

of Lectures and Clinics, with Infirmary practice,

October 1 to March 1.

For Catalogue or other information, address

FRANK ABBOTT, M.D., Dean,
22 West Fortieth Street.

Pennsylvania College of Dental Surgery.

Eleventh Street, below Spruce, corner of Clinton.

THIRTY-NINTH ANNUAL SESSION, 1894-95.

FACULTY AND AUXILIARY INSTRUCTORS.

J. EWING MEARS, A.M., M.D., Professor of Anatomy and Surgery.

C. N. PEIRCE, D.D.S., Professor of Physiology, Dental Pathology, and Operative Dentistry.

WILBUR F. LITCH, M.D., D.D.S., Professor of Prosthetic Dentistry, Materia Medica, and Therapeutics.

HENRY LEFFMANN, M.D., D.D.S., Professor of Chemistry and Metallurgy.

ALBERT P. BRUBAKER, M.D., D.D.S., Professor of Physiology and General Pathology.

PERCIVAL E. LODER, M.D., D.D.S., Demonstrator of Anatomy.
GEO. W. WARREN, D.D.S., Chief of the Clinics and Demonstrator of Operative Dentistry.
I. NORMAN BROOMELL, D.D.S., Demonstrator of Prosthetic Dentistry.
EDWARD F. WAYNE, D.D.S., Demonstrator of Chemistry.
FREDERICK R. BRUNET, D.D.S., Demonstrator of Prosthetic Dentistry.
RUPERT BEALE, D.D.S., Demonstrator of Prosthetic Dentistry.
WILLIAM B. WARREN, D.D.S., Demonstrator of Operative Dentistry.
A. W. DEANE, D.D.S., Demonstrator of Prosthetic Dentistry.
R. WALTER STARR, D.D.S., Instructor in Crown- and Bridge-Work.
W. K. THORPE, D.D.S., Demonstrator of Operative Dentistry.
GEO. M. WEIRICH, D.D.S., Demonstrator of Operative Dentistry.
MARTHA ALLAIRE TERRY, D.D.S., Demonstrator of Operative Dentistry.
LUTHER G. TERRY, D.D.S., Demonstrator of Operative Dentistry.
E. ROLAND HEARN, D.D.S., Demonstrator of Operative Dentistry.
I. ALBERTO DEL SOLAR, D.D.S., Demonstrator of Operative Dentistry.
R. H. SAVAGE, D.D.S., Demonstrator of Operative Dentistry.
E. A. KRETSCHMAN, Instructor in Modeling.
F. A. CONEY, D.D.S., Instructor in Carving Block-Teeth and Full Porcelain Dentures.

CLINICAL INSTRUCTORS.

Dr. J. N. FARRAR,
Dr. W. G. A. BONWILL,
Dr. A. L. NORTHROP,
Dr. C. S. STOCKTON,
Dr. CHAS. F. BONSALL,
Dr. C. E. FRANCIS,
Dr. E. C. BAXTER,
Dr. JOHN B. WOOD,
Dr. A. H. BROCKWAY,
Dr. C. PALMER,
Dr. R. H. SHOEMAKER,
Dr. T. F. CHUPEIN,
Dr. W. R. MILLARD,
Dr. W. H. TRUEMAN,
Dr. R. HOLLENBACK,
Dr. J. G. TEMPLETON,
Dr. A. B. ABELL.

This College has accepted the requirements of the National Association of Dental Faculties with regard to admission and graduation of students. (See announcement for 1894-95, which can be procured from the Dean.)

THE SPRING AND FALL SESSIONS.

The Spring Course commences on the second Monday in March and continues until June 20. Fee, $50, which will be credited upon the fee for the regular session.

The Fall Course will commence September 3, and continue until the first of October, and will be free to those who matriculate for the regular session.

Attendance upon the Spring and Fall Courses will be deemed equivalent to the term of pupilage under a private preceptor.

THE REGULAR SESSION

Will commence on October 1, and continue until the 8th of March ensuing. Twenty lectures will be delivered each week on the various branches taught.

CLINICAL PRACTICE.

Lecture hours excepted, general clinical practice is available for the student continuously through the day. Competent instructors are always present.

GRADUATION IN MEDICINE.

By an arrangement with Jefferson Medical College, such students as may desire to do so can, if found qualified, obtain the two degrees, in Dentistry and Medicine, in four years. Students desiring to graduate in medicine are required to notify the Dean of their intention at the beginning of their second course.

FEES.

Matriculation (paid but once)	$5.00
For the Course (Demonstrators' Ticket included)	100.00
Dissecting Fee	10.00
Diploma Fee	30.00

Board can be obtained at from $4.00 to $6.00 per week.

The instruments and tools required can be procured for from $35.00 to $45.00. This sum does not include the price of dental engine.

For further information, address

C. N. PEIRCE, D.D.S., Dean, 1415 Walnut St., Philadelphia.

The Baltimore College of Dental Surgery,

Chartered by the Legislature of Maryland in 1839.

THE OLDEST DENTAL COLLEGE IN THE WORLD.

FACULTY.

M. WHILLDIN FOSTER, M.D., D.D.S., Professor of Therapeutics and Pathology.
WM. B. FINNEY, D.D.S., Professor of Dental Mechanism and Metallurgy.
B. HOLLY SMITH, M.D., D.D.S., Professor of Dental Surgery and Operative Dentistry.
THOMAS S. LATIMER, M.D., Professor of Physiology.
WILLIAM SIMON, M.D., PH.D., Professor of Chemistry.
CHARLES F. BEVAN, M.D., Clinical Professor of Oral Surgery.
J. W. CHAMBERS, M.D., Professor of Anatomy.
GEORGE H. ROHE, M.D., Professor of Materia Medica.

LECTURERS.

R. BAYLY WINDER, Phar. G., D.D.S., Materia Medica.
WM. F. SMITH, A.B., M.D., Regional Anatomy.
J. N. FARRAR, M.D., D.D.S., Irregularities.
J. MEYER, D.D.S., Continuous-Gum.
DR. GEORGE EVANS, Crown- and Bridge-Work.
DR. K. C. GIBSON, Artificial Palates and Fractured Maxillaries.

CLINICAL INSTRUCTORS.

CORYDON PALMER, D.D.S.	Ohio.	C. M. GINGRICH, D.D.S., Resident	Md.
E. PARMLY BROWN, D.D.S.	N. Y.	J. HALL MOORE, M.D.	Va.
A. L. NORTHROP, D.D.S.	N. Y.	JOHN ALLEN, D.D.S.	N. Y.
CHAS. R. BUTLER, D.D.S.	Ohio.	R. B. DONALDSON, D.D.S.	D. C.
E. L. HUNTER, D.D.S.	N. C.	H. A. PARR, D.D.S.	N. Y.
W. W. WALKER, D.D.S.	N. Y.	J. EMORY SCOTT, D.D.S.	Md.
T. S. WATERS, D.D.S.	Md.	E. R. RUST, D.D.S.	D. C.
DAVID GENESE, D.D.S.	Md.	C. L. ALEXANDER, D.D.S.	N. C

DEMONSTRATORS.

W. G. FOSTER, D.D.S., Demonstrator of Operative Dentistry.
GEORGE E. HARDY, M.D., D.D.S., Demonstrator of Mechanical Dentistry.

ASSISTANT DEMONSTRATORS.

W. W. DUNBRACCO, D.D.S.
J. W. SMITH, D.D.S.
G. MARSHALL SMITH, D.D.S.
J. E. ORRISON, D.D.S.
W. S. TWILLEY, D.D.S.
J. S. SUTHERLAND, D.D.S.

W. F. SMITH, A.B., M.D., Demonstrator of Anatomy.
LOUIS F. ANKRIM, M.D., Assistant Demonstrator of Anatomy.
R. G. DAVIS, M.D., Assistant Demonstrator of Anatomy.
W. F. SMITH, A.B., M.D., Assistant Demonstrator of Anatomy.

The Baltimore College of Dental Surgery, the first, and for many years the only dental school, offers facilities for the study of dentistry proper such as age and experience only can give. Its immense museum, complete apparatus, large and well-arranged building, and carefully studied curriculum, give to its students great advantages and opportunities, both theoretical and practical, while its age gives its diploma a dignity far out-ranking all other colleges—a diploma honorably represented in all civilized countries, and held by the most distinguished members of the dental profession.

The fact that dentistry must be practically taught is fully recognized, the College Infirmary, a most complete, large, and handsome hall, being daily filled with clean and respectable patients, of a class nearly equal to those of the average dentist. The Infirmary is open all the year, students paying an entrance fee, which is deducted from those of the regular succeeding course.

The session begins October 1, closing in March. A large corps of demonstrators, always present, put in actual practice the teachings of all lecturers in dentistry—leaving nothing undemonstrated. All methods are fully taught, all appliances and apparatus used; the making of instruments and the most elaborate gold and continuous-gum work, and all the cases arising in ordinary practice, with many which are rarely seen, carefully demonstrated.

The College has formed an alliance with the College of Physicians and Surgeons by which its students are privileged to attend all lectures and clinics. The patients of this medical school numbered last year over 40,000.

Graduates of the Baltimore College of Dental Surgery are required to attend but one session at the College of Physicians and Surgeons prior to presenting themselves as candidates for the degree of M.D. (See Catalogue.) **In accordance with the resolutions adopted by the National Association of Dental Faculties, which go into effect for the session of 1891 and 1892, the qualifications for entering the first year's course are a preliminary examination in the ordinary English branches.**

TERMS OF GRADUATION.—Attendance on three winter courses of lectures in this College; as equivalent to one of these we accept one course in any reputable dental college. Graduates in Medicine can enter the Junior class.

BENEFICIARY STUDENTS.—Each State Dental Society is privileged to send one Beneficiary Student to this College at one-half the regular fees. This has been for some years an established feature of this College.

FEES.—Matriculation (paid once only), $5.00. Tuition fees, $100.00. Diploma fee, $30.00 Dissecting fee, $10.00.

Students corresponding with the Dean will please be careful to give full address, and direct their letters to

Prof. M. W. FOSTER, Dean,
No. 9 W. Franklin St, Baltimore, Md.

Harvard University, Dental Department.

BOSTON, MASS., 1894-95.

FACULTY.

CHARLES W. ELIOT, LL.D., President.
THOMAS H. CHANDLER, D.M.D., Dean, and Professor of Mechanical Dentistry.
J. COLLINS WARREN, M.D., Professor of Surgery.
HENRY P. BOWDITCH, M.D., Professor of Physiology.
THOMAS DWIGHT, M.D., Professor of Anatomy.
THOMAS FILLEBROWN, M.D., D.M.D., Professor of Operative Dentistry.
WILLIAM B. HILLS, M.D., Assistant Professor of Chemistry.
CHARLES MINOT, M.D., Professor of Histology.
CHARLES A. BRACKETT, D.M.D., Professor of Dental Pathology.
EUGENE H. SMITH, D.M.D., Instructor in Orthodontia.
EDWARD C. BRIGGS, M.D., D.M.D., Assistant Professor of Materia Medica and Therapeutics.
JERE E. STANTON, M.D., D.M.D., Instructor in Oral Anatomy, Physiology, and Bacteriology.

OTHER INSTRUCTORS.

FOREST G. EDDY, D.M.D., Instructor in Operative Dentistry.
GEORGE H. MONKS, M.D., Instructor in Surgical Pathology.
GEORGE L. WALTON, M.D., Instructor in Neurology.
EZRA F. TAFT, D.M.D., Instructor in Operative Dentistry.
FREDERICK S. HOPKINS, D.M.D., Instructor in Operative Dentistry.
WILLIAM P. COOKE, D.M.D., Instructor in Crown- and Bridge-Work.
DWIGHT M. CLAPP, D.M.D., Clinical Lecturer in Operative Dentistry.
EDWIN C. BLAISDELL, D.M.D., Instructor in Operative Dentistry.
HENRY W. GILLETT, D M.D., Instructor in Operative Dentistry.
WILLIAM H. POTTER, D.M.D., Clinical Lecturer in Operative Dentistry.
WALDO E. BOARDMAN, D.M.D., Instructor in Operative Dentistry, and Curator of Museum.
FREDERICK BRADLEY, D.M.D., Instructor in Operative Dentistry.
CHARLES M. KEEP, D.M.D., Instructor in Operative Dentistry.
HENRY L. UPHAM, D.M.D., Instructor in Operative Dentistry.
ARTHUR H. STODDARD, D.M.D., Instructor in Mechanical Dentistry.
ELLIS P. HOLMES, D.M.D., Instructor in Operative Dentistry.
CHARLES E. PERKINS, D.M.D., Instructor in Operative Dentistry.
PATRICK W. MORIARTY, D.M.D., Demonstrator of Mechanical Dentistry.
FRED H. WOODCOCK, D.M.D.,Instructor in Mechanical Dentistry
HARRY SNOW PARSONS, D.M.D., Instructor in Mechanical Dentistry.
HARRY O. BIXBY, D.M.D., Instructor in Mechanical Dentistry.
FRANK T. TAYLOR, D.M.D., Instructor in Operative Dentistry.
ARTHUR W. ELDRED, D.M.D., Instructor in Mechanical Dentistry.
JOSEPH J. PAUL, D.M.D., Demonstrator of Operative Dentistry.
ARTHUR J. OLDHAM, D.M.D., Instructor in Mechanical Dentistry.
NATHAN P. WYLLIE, D.M.D., Assistant Demonstrator of Operative Dentistry.

The Twenty-seventh Annual Session of this school begins Sept. 27, 1894, and ends June 26, 1895, with a recess of one week at Christmas, and another in April, making a school-year of nine months of practically continuous work.

General Anatomy, by Dr. Thomas Dwight; *Physiology*, by Dr. H. P. Bowditch; *General Chemistry*, by Dr. Wm. B. Hills; and *Histology*, by Dr. Minot, together with ample dissecting under able demonstrators, are the studies of the first year, and are identical with those of the Harvard Medical School. The studies for the second year are Operative and Mechanical Dentistry, Materia Medica and Therapeutics, Oral Surgery, and Surgical Pathology. Of the third year the studies are Operative and Mechanical Dentistry and Orthodontia. Attention is called to the fact that *twenty-seven months* of progressive instruction compose the required three years in the school.

All applicants for advanced standing must pass the examinations of the years they desire to omit, or furnish proof that they have passed *equivalent* examinations.

At the end of each year written and oral examinations test the student's knowledge, and he must pass satisfactorily in a majority of the studies of each year before he can pass on to the next year's class.

To those wishing to take the medical degree the studies taken in the first year of this school are allowed in the Medical School of the University, after passing the required entrance examinations.

The University Degree, D.M.D. (*Dentariæ Medicinæ Doctor*), is conferred upon all who fulfill the requirements.

Graduates of recognized dental schools will be admitted to the courses of Operative and Mechanical Dentistry on payment of $50 each, or $100 for both, for the whole or any portion of the academic year.

FEES.

There are no fees for matriculation, nor for the diploma, nor for the demonstrators. For the first year the student is a member of the school the fee is $200, payable in two installments of $120 and $80; for the second year, $150, in two payments of $100 and $50; for any subsequent year, $50. For information and announcements, address

THOMAS H. CHANDLER, Dean,
161 Newbury Street, Boston, Mass.

ESTABLISHED 1845.

Ohio College of Dental Surgery.

DEPARTMENT OF DENTISTRY—UNIVERSITY OF CINCINNATI.

SESSION 1894-95.

FACULTY.

J. S. CASSIDY, A.M., M.D., D.D.S., Professor of Chemistry and Materia Medica

H. A. SMITH, A.M., D.D.S., DEAN OF THE FACULTY, Professor of Operative Dentistry and Dental Pathology.

C. M. WRIGHT, A.M., D.D.S., Professor of Physiology and General Pathology.

WM. KNIGHT, M.D., D.D.S., Professor of Anatomy and Oral Surgery.

GRANT MOLLYNEAUX, D.D.S., Professor of Prosthetic Dentistry and Metallurgy.

C. I. KEELY, D.D.S.,
Lecturer on Orthodontia.

L. E. CUSTER, D.D.S.,
Lecturer on Anæsthetics and Obtundents.

DEMONSTRATORS.

T. I. WAY, D.D.S., and H. A. WHITESIDE, D.D.S.,
Demonstrators of Operative Dentistry and Instructors in Operative Technics.

F. A. LUSH, D.D.S.,
Demonstrator of Prosthetic Dentistry and Instructor in Prosthetic Technics.

H. C. MATLACK, D.D.S.,
Demonstrator of Anatomy.

H. T. SMITH, D.D.S.,
Demonstrator of Analytical Chemistry.

The Forty-ninth annual session begins Monday, October 1, 1894, and closes March 30, 1895.

FEES.

Freshman Year.

Matriculation	$5.00	Professors' Tickets	$75.00
		Dissecting Ticket	10.00
Junior Year.		Senior Year.	
Professors' Tickets	$75.00	Professors' Tickets	$75.00
Dissecting Ticket	10.00	Graduation Fee	25.00
Analytical Chemistry	10.00		

For further information and Announcements, address

H. A. SMITH, D.D.S., Dean,
or H. T. SMITH, D.D.S., Secretary,
128 Garfield Place, CINCINNATI, O.

COLLEGE OF DENTISTRY,

University of California.

SAN FRANCISCO, CALIFORNIA, U. S. A.

FACULTY.

MARTIN KELLOGG, A.M., LL.D., President of the University, and *ex-officio* President of the Faculty.
JOSEPH LECONTE, M.D., LL.D., Honorary Professor of Biology.
WILLIAM E. TAYLOR, M.D., Emeritus Professor of Surgery.
C. L. GODDARD, A.M., D.D.S., Professor of Orthodontia.
L. L. DUNBAR, D.D.S., Dean, and Professor of Operative Dentistry and Dental Histology.
MAURICE J. SULLIVAN, D.D.S., Professor of Dental Pathology, Therapeutics, and Materia Medica.
WILLIAM B. LEWITT, M.D., Professor of the Principles and Practice of Surgery.
A. L. LENGFELD, M.D., Professor of Chemistry and Metallurgy.
A. A. D'ANCONA, A.B., M.D., Professor of Physiology and Histology.
JOHN M. WILLIAMSON, M.D., Professor of Anatomy.

LECTURERS, DEMONSTRATORS, AND ASSISTANTS.

CHARLES BOXTON, D.D.S., Lecturer on Mechanical Dentistry.
CHARLES A. LITTON, D.D.S., Superintendent of Infirmary.
J. W. LIKENS, D.D.S., Demonstrator of Operative Dentistry.
HARRY P. CARLTON, D.D.S., Instructor in Operative Technic.
PAUL C. ERHARDT, D.D.S., Demonstrator of Operative Dentistry.
CHARLES BOXTON, D.D.S., Mechanical Technic.
ALBERT T. DERBY, D.D.S., Demonstrator of Mechanical Dentistry.
W. F. SHARP, D.D.S., D.M.D., Instructor in Operative Dentistry.
H. D. NOBLE, D D.S., Demonstrator of Mechanical Dentistry.
HAROLD L. SEAGER, D.D.S., Demonstrator of Mechanical and Operative Technic.
JOHN H. BARBAT, PH.G., M.D., Demonstrator of Anatomy.
O. W. JONES, M.D., Assistant Demonstrator of Anatomy.
S. J. FRASER, A.B., M.D., Assistant Demonstrator of Anatomy.
J. D. HODGEN, D.D S., Assistant in Chemistry and Metallurgy.
H. D NOBLE, D.D.S., Demonstrator of Orthodontia Technic.
JAMES G. SHARP, D.D.S., Assistant to the Chair of Physiology and Histology.

CLINICAL INSTRUCTORS.

J. L. Asay, M.D.
F. W. Bliss, D.D.S.
Geo. H. Chance, D.D.S.
H. C. Davis, L.D.S.
Warren DeCrow.
A. O. Hooker.
H. E. Knox, D.D.S.
W. F. Lewis.
J. P. Parker, D.D.S.
W. E. Price, D.D.S.
Wm. B. Sherman, D.D.S.
Max Sichel.
E.L. Townsend, D.D.S.
L. VanOrden, M.D., D.D.S.
F. H. Metcalf, D.D.S.

The thirteenth session (1894) begins on Monday, September 3, and closes May 31, 1895.

The established standard for admission is of the same grade as that required for entrance to the High Schools, with the addition of elementary Physics, Chemistry, and Latin.

Three full courses of study of nine months each are required for graduation.

The courses of study are graded, with examinations at the end of each year.

A course in Microscopic Technic is a requirement in the Freshman year.

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The instruction in both operative and mechanical dentistry is as thorough as it is possible to make it, and embraces everything pertaining to dental art. The advantages which the general and oral surgical clinics, to which the dental students are admitted, as indeed to all the lectures of the University, afford, cannot be overestimated. The many thousands of patients annually treated in the University Hospital, well known to be the largest Hospital in Baltimore, afford an abundance of material for dental infirmary and laboratory practice, and the oral surgery clinics.

The Infirmary and Laboratory practice for students is exceptionally large, a fact that adds so greatly to the facilities of this Dental School.

The Dental Infirmary and Laboratory Building is one of the largest and most complete structures of the kind in the world. The Infirmary is lighted by forty-seven large windows, and is furnished with the most improved operating chairs. It has again become necessary to enlarge the Dental Building, making an Infirmary nearly one hundred feet long, and a Laboratory eighty feet long and forty-three feet wide.

The Dental Infirmary and Laboratory are open daily (except Sundays) during the entire year for the reception of patients; and ***the practice for dental students*** has increased to such an extent that all the students during the past session have had an abundance of practical work in both operative and prosthetic dentistry. This means for practical instruction has already assumed such large proportions that the supply has been beyond the needs of the large classes in attendance during the past sessions. The exceedingly large number of patients for the extraction of teeth affords ample facilities for practical experience to every student.

In addition to the facilities afforded by this institution for a thorough course of instruction in the theory and practice of dentistry, the clinics in the University Hospital enable the Dental equally with the Medical Students to become familiar with the diseases and operations of Practical Surgery. Excisions of jaw, partial or entire; tumors, cancerous or benign, of various parts of the buccal cavity; plastic operations for restoration of cheek, lips, etc., may be mentioned as having been before the class during the year. The induction of anesthesia by means of different agents—ether, chloroform, bromide of ethyl, nitrous oxide gas, all being used in the clinics—cannot fail to be of use to the student of Oral Surgery. Junior as well as Senior students are afforded every opportunity for practical instruction in both operative and mechanical dentistry.

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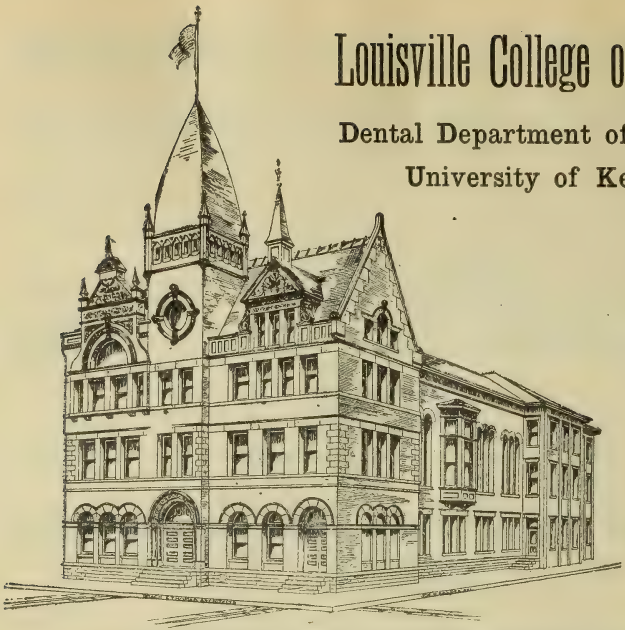

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